THE

SOUTHERN AGRICULTURIST,

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PART I.

ORIGINAL COMMUNICATIONS.

General Remarks on the advantages of converting to a useful purpose valuable and neglected materials, and on the advantage of Manufacturing Cotton-seed Oil.

To the Editor of the Southern Agriculturist.

MAN seems to be insatiable in drawing upon the resources of mother earth, and she in return, seems to keep pace with his covetous desires. This restless spirit of our nature gives a value and charm to life, by diversifying our pursuits, and making each to yield his share in promoting the general happiness of the whole. The ingenuity and industry of our Northern brethren is proverbial. Dependant almost exclusively upon their own labour for subsistence and advancement, it becomes important to them to economize that labour, and to render it as productive as possible. We find them accordingly, devoting their skill to the mechanic arts, particularly that branch of it connected with the invention and construction of labour-saving machinery, deemed to be a curse in countries of condensed population, but in our land "flowing with milk and honey," a blessing of the highest order. Those who recollect the laborious, imperfect, and tedious process of cleaning rice and preparing it for market, previous to the introduction of the rice-mill, will, at once see, at least, on the score of humanity to our slaves, the great

debt of gratitude Carolina owes to the elder Lucas, who, though not a Yankee, was a native of a country not less shrewd than that ingenious race. Until the introduction of the saw-gin, the labour of cleaning the green-seed cotton, rendered it almost unworthy of cultivation. How has that simple machine advanced the wealth of this country, by placing at the disposal of the cotton grower, facilities for the preparation of their crop for market, adding to it a sum little short of fifty millions of dollars annually.

In contemplating the past, we may be permitted to anticipate the future. So abundant is nature in her gifts, that in this favoured land, her portals are thrown open to all whose industry and ingenuity would tempt them to enter. With us, the means of living, and even providing for our posterity, are so ample, that the resources of our ingenuity are seldom or never drawn upon; as our ancestors prospered under certain management, we care not to deviate from the track, and hence it is, that our pursuits, particularly in Agriculture, seems to be but a continuation of those of our fathers. It is, perhaps, after all, a safe plan to "let well enough alone," as a general principle, but, frequently, occasions arise where it might safely be deviated from. Our planters are not avaricious, there is an open frankness, generous hospitality, and high sense of honour, spirit and liberality in that class of the gentlemen of the South, which gives a character to our State, and those approximated to us, that yield a charm to the Southern character; and thus it is, that inordinate love of money and pressure of pecuniary want, do not drive them to those exertions necessary to gratify the one, or avert the other. In less favoured regions of this Union, where but a small portion of the year will enable the inhabitants to devote themselves to out-door work every thing with them must be in reference to economy—their time must be made the most of—their money must be rigidly taken care of—they must make their labour the most efficient;—attention to all these things must create in them intense anxiety;—their minds, naturally active and on the alert, become exercised in that season of the year when they are locked up in regions of ice and snow. They know that they must depend upon their own personal labour, or that of the precarious hireling for their subsistence and advancement, a thousand plans and

schemes enter into their view, to obtain the greatest results from the smallest means, and the principal one is to diminish their labour, or enable them to divert it to some other branch, by the introduction of machinery—in this way, our Northern brethren have added much to the prosperity of our common country. The various implements and tools with which a northern farm teems, almost unknown to us, display, in high terms, the ingenious character of the country, and evince the truth of the old adage, that "necessity is the mother of invention."

Not having at the South the pressing necessities above described, may be a reason why so little ingenuity is to be found amongst our farmers and mechanics; they are content to plod on, in the old way, and to shuffle on as well as they can. We find in the small State of Connecticut, Silk to an incredible amount, annually made, and that too in a region highly unfavourable to that pursuit; whilst at the South, with a great deal of spare labour, in a region peculiarly favourable to the cultivation of silk, we hear occasionally of a few hanks being made by females, handed about as objects of great curiosity; but the truth is, our great planters are too rich to embark in an undertaking of this kind, our small planters are satisfied with the few bushels of corn, yielded to the acre, by their worn-out lands, and the few loads of bacon brought by them to market;—our farmers are satisfied with the few vegetables, and small amount of poultry they raise for sale—and the squalid Squatter is satisfied in his lazy retreat, surrounded by a half-starved wife, upon whom he is dependent for his precarious subsistence, and that of his clay-eating offspring, if he has only lightwood in abundance. All this is the result of habit, and may be placed to the account of a deficiency of energy that creates a state of apathy which renders them unable to draw from intellectual sources.

The ingenuity and acuteness of the Northern farmer, enables him to convert the very offals of his farm into a profit; whilst with us, many of our products are disregarded, or used for purposes for which they are too valuable; and this is particularly the case with *Cotton-seed*, which can easily be made to add greatly to the wealth of the planter, by manufacturing oil from it, or selling it to those who should establish manufactures of this kind. It had been long known that the kernel of the cotton-seed

yielded a large portion of what is termed fixed or fat oil, in contradistinction to what is termed volatile, or essential oil; the former requiring a high temperature to convert it into vapour, whilst the latter may be raised to that state at the temperature of boiling water, and even below it.

It is a curious fact, that the volatile and fixed oils, may be produced by the same plants, but never from the same part; the bark or wood always yielding the former, and the seeds only the latter. It is said, that the olive forms an exception, the fruit affording the oil and not the kernel. The seeds of plants that yield fixed oils are of peculiar structure, being confined exclusively to those seed that have two lobes, and appertain to those plants called "*dicotyledonous*"—there is a considerable degree of mucilage in those seeds that yield oil, and hence, when bruised and mixed with water form a white fluid, composed of the oil with the mucilage, and called *emulsion*. Vast numbers of plants afford fat oils, those the most remarkable for their utility and abundance, are the Olive, from whence the olive oil is obtained—the seeds of lint, affording linseed oil—the kernels of almonds, forming Almond oil—the Bene oil from the bene-plant, and to us, the most important, the *Cotton-seed Oil* from our great staple commodity. And what is also remarkable in the construction of plants, that no trace of any oleagenous substance can be found in the roots, stems, leaves or flowers of any plant whose seeds yield a fixed oil. To obtain the oil from those seeds that contain it, it is necessary that they should be crushed, either by pounding or grinding; and then by pressure to force the oil from the pulp; hence, the term "expressed oils;" this is effected by enclosing the pulp in small bags, and submitting them to the heavy pressure of machinery, by which the oil is forced out and collected in proper vessels. The oil obtained in this way, is called "cold drawn oil," and is the purest. Some species of seed containing a considerable portion of oil, part with it with difficulty; and hence, it becomes necessary to extract it from seed of this description, that heat should be employed—this heat is applied either to the apparatus used in pressing out the oil, or the pulp is exposed to the vapour of boiling water, and in some instances the pulp itself is boiled, the whole mass suffered to cool, and the oil being the lighter body, swimming on the surface, is there collected. Oils, however, obtained by heat, are

very impure, being generally mixed with mucilage and other portions of the pulp; these are, sometimes, purified by washing and filtration, but never vie in quality with those that are expressed.

From what has been said, it is evident that the process of making oil is a very simple one, and within the reach of all possessing ordinary skill and industry. In a country like ours, abounding with incalculable quantities of cotton-seed, it is a subject of wonder, that so little has been done towards the manufacture of *Cotton-seed Oil.* I am satisfied that a great difficulty presented itself in preparing the seed for the press. In preparing linseed and other oils from soft shell seed, nothing more was necessary than to bruise the seed and express the oil; but the kernel of the cotton-seed is enveloped in a thick stubborn shell, which may be crushed, but cannot be entirely broken up, and being mixed with the seed, offered an obstacle to the pressure, that could not be overcome, and rendered the whole process extremely imperfect. To obtain, then, the means of manufacturing Cotton-seed Oil, as perfect as oils of other description had been manufactured, it became necessary that the kernels, divested of their shells, should be submitted to the process. To effect this purpose, machinery was necessary, and such has been invented, with what success, I believe, has as yet not been satisfactorily ascertained. There is a description of one published in the *Southern Agriculturist*, vol. vii. p. 105, which appears to be very plausible, so far as the hulling of the seed is concerned, but there is no description of the method by which this machine separates the hull from the kernel after the operation of grinding, for if this is not effected, I do not see that any thing is gained by the invention.

It does not appear that the inventor of this machine is a practical mechanist, but he states that he has only expressed this oil for his own use; we presume, therefore, that the preparation of the pulp was effected by the machine he describes; it is to be regreted, that he does not state the quantity of oil produced by a bushel of seed, and the quantity that might be expressed in a given time, the necessary quantum of labour, and the value of the manufactured article; for, after all, the profit and loss, must depend upon these combinations. It appears, however, that he has fully tested the value of the oil for painting, for he states

that his dwelling house has been recently painted with the oil, and he thinks it the best painted house in Georgia.

From some experiments made in Massachusetts, it appears that one bushel of cotton-seed will yield seven pints of oil, and that the remainder of the pulp is equal in value to corn-meal for feeding cattle. Cotton-seed, as a manure, is not worth more than 4 cents a bushel; from this, we can easily calculate, what is annually lost to South-Carolina, in her citizens not availing themselves of a material produced in great abundance, easily manufactured, and yielding a rich harvest.

A planter who raises 200 bales of cotton, will have 6000 bushels of seed, worth, if used for manure, about $240. This quantity will produce, according to the Massachusetts experiment, 42,000 pints, or 5250 gallons of oil, worth at least $1 a gallon from the various useful purposes to which it may be applied. It is highly probable that this falls far short of what would have been the result, had the machinery, with which the pulp was prepared, been more perfect. It is estimated that the seed-meal is worth, as food for cattle, 30 cents a bushel; which would be an addition of $1800, equal to the increase in the value of the crop, to $36 a bale.

A writer in the *American Farmer*, vol. v. p. 246, states, that he procured from 9 bushels of cotton-seed, 25 quarts of oil, nearly 3 *quarts to the bushel*. The process he used was that practised in extracting oil from flax-seed; the oil, he says, was clear, of a quality quite *equal, if not superior to flax-seed oil, for painting*. "The seed, he observes, was not of the best quality, nor was the experiment very perfectly made." This would appear incredible, but it is probable the process was forced by heat, yielding an article in greater quantity, but less pure than that which resulted from the Massachusetts experiment.

By an act of the legislature, at the last session, I perceive a company has been incorporated, for the manufacture of the article here spoken of. It must be a source of gratification to all interested in the welfare of our country, that an effort will be made, to convert to a useful purpose, a highly valuable and neglected material; an effort which in yielding wealth to the citizen, will advance the prosperity and honour of South-Carolina.

SCRIBA.

Account of the Mineral Springs of Virginia.

To the Editor of the Southern Agriculturist.

Dear Sir,—In compliance with the promise I made you sometime since, I now proceed to give you a short account of the Mineral Springs of Virginia. I regret, that owing to my not having resided long enough at any, with the exceptions of the Red Sulphur and Grey Sulphur Springs, I cannot enter as much into details as is desirable. I have, however, visited all of them, (with one exception) and am no stranger to their virtues as reported by others. At the Red Sulphur, I have spent three seasons, and have received much benefit from the use of its waters. Of the Grey Sulphur Spring, I shall speak from my own knowledge, having paid particular attention to the action of its waters during the last season. The information I shall give relative to the other Springs, will be derived partly from my own observations, and partly from those of some of my friends, who have resided at them, and are conversant with their virtues. Having premised thus much, I now proceed to give you such information as I am in possession of.

The Mineral Springs of Virginia, are situated near the centre of that State, among the Allegany Mountains and their spurs, principally to the west of the great chain. There are also a few, situated to the east of the mountains, but they are not much resorted to, and being far apart from each other, and from those on the western side, are not likely to be. These I have never visited, nor am I acquainted, even by report, with their virtues. All of my remaks, therefore, must be considered as relating exclusively to those among, and to the west of the Alleganies, which in common parlance are the only ones alluded to, when speaking of the Virginia Springs.

There are eight Mineral Springs, which are resorted to by invalids and fashionists, besides many others not yet known, some of which, will, in all probability, be brought into notice hereafter, as this region becomes more frequented. They are situated almost in a line, and parallel with the range of mountains, running from East to West. They have of late years risen rapidly in repute, as they have become more known, and now are yearly crowded with visiters from every section of the United

States, some seeking restoration of health, and others merely recreation. So great has been the increase of company of late years, that notwithstanding the many new and extensive buildings erected, (and additional ones are put up every year at some one or other of the Springs, very often at all of them*) it has been found impossible to accommodate all visiters at the Springs, and many have had to stay at the neighbouring farm-houses and taverns and in the small towns, until they could procure apartments. This has been more particularly the case at the White Sulphur, but all of the Springs the last season, (and also the one previous) were so crowded that it was almost impossible, at times, to procure comfortable accommodations. The annual increase of visiters is truly surprising. It does not, therefore, require the aid of prophecy, to foretell that this section of country will, ere long, become the principal resort for invalids, and the gay and the fashionable world, as well as men of leisure, who seek to while away the tedious months of summer in an agreeable manner.

To invalids, the Mineral Springs of Virginia, offer greater inducements than those of any other part of the Union, and are not surpassed by any in the world. These may appear, to those who have never visited them, bold assertions; but when they are made acquainted with the grounds on which this opinion is ventured, some, in all probability, will agree with me. I have, at least, high authority in support of this opinion, independent of my own observations and experience. Dr. Bell observes:† "If to these Springs—the *Sweet*, the *Warm*, and the *Hot*, be added, the *White Sulphur*, the *Salt Sulphur*, and the *Red Sulphur*, we can safely challenge any district of country of the same extent in the world, as that in which these Springs are situated, to produce the same number and variety, whether we have regard to mineral impregnation, or temperature; or the use of which shall be attended with more speedy, entire, and permanent relief from a host of the most distressing maladies." The Grey and Blue Sulphur Springs, (which

* In addition to what were formerly erected, during the last season, extensive improvements were made at the Red, Blue and Grey Sulphur Springs, and also at the Hot Springs, principally at the two first.

† Bell on Baths and Mineral Waters, p. 529.

are in the neighbourhood of those enumerated) were not then known, and as both are highly medicinal, and differ in their qualities from the others, they add to the number as well as variety.

That this is not mere opinion, I will concisely state on what it is grounded. In the first place, I know of no spot where are located so many medicinal springs, each differing in component parts, and suited to different diseases, or the same disease in different stages. The invalid has it in his power to try no less than eight Mineneral Springs, situated so near, as to be but pleasant rides from the one to the other.* Thus he is enabled, should he find the one to which he has been directed, not suitable to his case, to change it in the course of the morning, or a day at most, to another, so essentially, (perhaps totally) different in its constituents, and consequently action on the system, as to afford him another opportunity of regaining his health; and should he be once more mistaken, he can again move on to another, and another, and another, until he has at length discovered the one best suited to his case: for there are few diseases, if any, which are not alleviated by a judicious use of these waters, and very many are entirely cured by them. And where shall we find such another spot? Most of the celebrated Springs, both of Europe and America, stand alone, or if there be others in their neighbourhood, they differ so little in quality as scarce to be noticed. Most of those in the United States, (with the above exceptions) are thus situated, the invalid who has suffered years of torment, and has been, at last, induced to try the efficacy of the waters of some particular spring, feels as if the last link was broken, and his last hope destroyed, when he discovers that his case has been mistaken, and that the waters to which he has been sent do not suit him, or perhaps, what is still worse, has aggravated his disease, and he turns towards his home with the sole wish, that he may be at least, permitted to return and die in the bosom of his family. I have been a witness to such deep despondency, and to its sad effects. But at the Virginia Springs, all hope is not thus suddenly extinguished, and although no one can for a moment suppose that *all* diseases are cured here, yet the chances are so many more than are to be found elsewhere, that the invalid is more calm and

* Most of them are so near, that the ride is usually performed between breakfast and dinner.

composed: for he has the opportunity of testing the qualities of several Springs before he departs, and as each of these differ so much in medicinal qualities, he becomes confident that he will find alleviation, if not a cure for his complaint. The beneficial effects of this composure of mind, is well known to all medical men. Nor is the variety of Springs the only inducement. The climate is decidedly the most delightful, during summer I have ever been in. The mornings and afternoons are cool, and the mid-day sun, although warm, is not disagreeable. Hundreds of visiters are yearly assembled there, and yet parasols and umbrellas are rarely used. The nights are generally so cool as to require a light blanket, and hence, the freshness and buoyancy which is felt on awaking in the morning. In addition to this, there is during the season a large, fashionable and constantly changing company, composed often of individuals, not only from every State in the Union, but not unfrequently from foreign parts, and these last will be more frequent visiters, as these Springs become better known. There are other inducements for spending the summer among these mountains, such as excellent fare, mountain scenery, the pleasures of the chase, &c. &c. The man of science has a still further inducement. The mineralogy and botany of this district has not, as far as I have been able to learn, been examined, (except, perhaps, cursorily, by some transient visiter) and the votary of these sciences, will find ample employment in exploring the valleys and mountains which surround him, and investigating the botanical character, and the geological formations of the country. But enough has been said, and I will only add, that I have found but few, who have visited these Springs, especially invalids, who have not wished again to visit them, and who have not done so when opportunity offered in preference to those of the other States.

Having said thus much on the inducements for visiting these Springs, I will now enter somewhat more into detail as to their situations and qualities. I regret that I cannot give you as precise information as is desirable, but such as it is, it is at your service.

A traveller from this State has two modes offered him of reaching these Springs, by his private conveyance, and by the steam-boat from hence to Norfolk and Richmond, and from thence by stages, which are excellent.

In many cases, it is preferable to travel in your private carriage. The time taken is longer, but you are compensated by having a conveyance at your command, to ride out and move from one Spring to another, which is no small convenience, especially as there are but few hacks as yet established. The shortest route is by the way of Camden, Charlotte, Salem, Good-spur Gap, and Newbern, at which place you cross the country to Giles Court-House, from which the Grey Sulphur Spring is distant about nine miles. The route by the way of Tennessee, is, I think better, but longer. There is, also, another, which branches off at Salem, to Fincastle, at which place you cross the Seven Mile Mountain, and another, the name of which I do not recollect, to the Sweet Springs. But should either the want of time, or a wish to be economical, render travelling in a private carriage objectionable, then the steam-boat can be resorted to, which renders the trip a short and very pleasant one: for a traveller from Charleston, can reach the White Sulphur Spring, (which is the most central and most resorted to) in the course of ten or twelve days. By this route, the first Spring reached is the *Warm Spring*, and with this, I will commence my description.

Immediately at the base of one of the loftiest and longest range of mountains, which is here called the "Warm Spring Mountain," is situated the celebrated *Warm Springs*. The several hills and mountains which you have to cross, are no longer the terror of the traveller. They are crossed by an excellent turn-pike graduated, (it is said) at five degrees, and over a large portion of which you can trot without distressing your horses. From the top of this mountain, the view is most splendid, and only surpassed by that from the top of the Good-spur Mountain. This Spring is much frequented during the season, but is used more as a luxury than for medicinal purposes. It rises in a meadow, and might be made one of the most splendid baths in the world. The basin in which it rises is circular, and if I recollect right, sixty feet in diameter, and sufficiently deep to swim in; it is beautifuly clear, and from the bottom, in every direction, you observe it bubling up, being impregnated with a considerable quantity of gass. At present, this noble Spring is covered with an old miserable building, but it is to be hoped tha this will not continue long, especially as such handsome

improvements have been made to other parts of the establishment. The accommodations here are very good, and a large brick hotel recently erected, adds much to the comfort, as well as appearance of the place. The County Court is held here, and consequently a court-house, goal, and a few other buildings are in the vicinity.

Five miles westwardly are the *Hot Springs*. These are highly celebrated, especially in cases of rheumatism and gout—in affections of the skin—of the liver, and various other diseases, they have been found exceedingly efficacious. There are several Springs here varying in their temperatures. The "*Boiler*," which is the hottest, is said to be 104° Fahrenheit, and where it issues from the spout, 106° Fahrenheit, the other baths are several degrees lower, and the present proprietor (Dr. Good,) who has already done much towards the improvement of the place, is now engaged in finishing a fine pleasure bath, in which visiters will have the opportunity of enjoying all the pleasures of the warm bath.

Still pursuing a westwardly route over a fine turnpike, you arrive at the highly celebrated *White Sulphur*, more resorted to than any other in the mountains, and always so crowded during the season as to be uncomfortable. Here are generally not only the invalids, but the fashionists from all parts of the Union, to the number of two or three hundred persons, (which is more than can be accommodated with the slightest degree of comfort) whilst numbers are turned off and have to wait in the neighbourhood, until some leave the place. The waters are highly serviceable in affections of the liver, and those diseases produced by the torpidity of that organ. There are many diseases which are cured by it, and were you to believe all that is said in its favour by its friends, you would suppose it impossible to die, whilst you used its waters; so various are the virtues ascribed to it. Unfortunately, this is carried too far, not only by the friends of this Spring, but by those of the other Springs; and I have known some serious and melancholy occurrences take place, from invalids being persuaded to make use of waters not adapted to their case. It is natural enough for those who have been cured at a certain Spring, to think highly of it, and to wish others to try it, and no doubt the advice is given with the best motives, but no one Spring can cure all diseases, and the invalid should be extremely cautious

how he tampers with them. If there be a physician at the Spring, he should be consulted by all means, and his advice followed.

In a northerly direction, and somewhere between twenty and twenty-five miles is the *Blue Sulphur*. This is a new Spring, opened for the reception of company for the first time last season, and at which very extensive improvements are in progress. I have never visited it, nor have any of my friends, and cannot, therefore, inform you what are its medicinal properties.

In an opposite direction and immediately under the long range of mountains, which is here called the Sweet Spring Mountain, is the *Sweet Springs*. This is the most open and might be made one of the most beautiful spots in the mountains. There is just enough of mountain scenery, of broken ground, of gentle elevations, and of level land, to render it highly pleasing, and it is capable of being rendered still more so, if a little labour and skill were bestowed on it. The waters are what are termed *accidulous* or *carbonated*, and are used both for drinking and bathing. There is, I think, a greater flow of water from this Spring, (or rather Springs, for several rise near each other) than from any other of the mineral springs. There are two apartments for bathing, one for the ladies and the other for gentlemen; besides a spring of the same water, which is used for drinking. The temperature of the water is 73° Fahrenheit, which renders it very pleasant to bathe in. To many its warmth renders it disagreeable to drink, whilst others are pleased with its pleasant sub-acid taste. It is highly impregnated with carbonic acid. This Spring was formerly almost wholly resorted to, the other Springs which since have become so celebrated, were then either unknown or but little thought of. As the properties of these have become known, the Sweet Spring has had to divide with its neighbours, the visitors which before resorted almost wholly to her fountain, for health. At present, these waters are used principally at the close of the season being considered as a tonic, and it is usual for the company which has been scattered during the season at the different Springs, to assemble here before their final departure homewards. Hence, at that period it becomes so crowded, that there is but little chance of being comfortable. Yet, it is the fashion, and therefore, all the inconvenience is submitted to.

The *Salt Sulphur Spring* is twenty-two miles from the Sweet Springs, and on the line of Springs running from East to West. This water resembles the White Sulphur in its effects, and by many, is thought superior; and cases have occured, I am informed, in which it has evinced a decided superiority over it. In all cases in which the use of that Spring is recommended, this can be used with advantage, and should be avoided in all cases in which that proves *injurious*. It contains a quantity of Epsom salts, whence its name of *Salt Sulphur*.

The accommodations at this Spring are decidedly the best in the mountains. The table is kept in a superior manner, abounding not only with the excellent fare of the country, but also many luxuries brought from the Atlantic cities. The attention paid to visiters by the proprietors, and by the servants, together with the excellent fare met with here, render the Salt Sulphur one of the pleasantest resorts, both for invalids and other company that is to be found in the mountains, and it is accordingly crowded during the season, for it is justly celebrated not only for the medicinal qualities of the waters, but for its excellent accommodations, and the attentiveness of the proprietors to the wants of their visiters, as well as the civilities of the servants.

In all I have written, I have said but little of the medicinal qualities of the waters. As stated in the first part of this communication, I have only resided long enough at the Red and Grey Sulphur Springs, to state any thing on my own knowledge. A medical friend who has often visited the Virginia Springs, has kindly supplied the deficiency, by permitting me to make use of a letter written by him, which accompanies this.

"*Dear Sir*,—When I had the pleasure of seeing you some weeks since, you requested me to give you some information relative to the use of the Mineral Waters of Virginia, in diseases. I have been frequently at all of the Springs, and have observed with some attention the patients who have resorted to them, and the effects produced upon them. The White Sulphur, as you know, is the place of fashion, if not of comfort; here the valetudinarean from whatever cause, is to be found drinking large drafts of this water, which is often a poison, most active and certain. In cases of purely hepatic disease, this water is an excellent remedy; it relieves with all the certainty of mercurial preparations, without any of their debilitating effects; in

amenorrhæa and dysmenorhæa, it is also a valuable assistant to the usual remedies, in affections of the spleen, and in chronic diarrhea, dependant upon derangement of the hepatic system, I have seen it prove highly valuable. This you will say is a long list, but here it must stop; I have seen much mischief result from its use in other diseases. In chronic head-ache, dyspepsia, dropsical affections, and above all, in pulmonary diseases, the use of this water is destructive and deleterious in the extreme. In all of the diseases to which this water is applicable, I think it inferior to its neighbour, the Salt Sulphur. Doctors, however, may preach, and nature may plead, but vanity will triumph, and fashion will have its votaries and victims: the nobility of Virginia flock to the White Sulphur, and the community will follow.

"The Salt Sulphur, I think preferable in all cases, as I said before to the White, but in dispeptic cases, I have seen it display uncommon remedial powers; it is mildly cathartic, and as I think anti-acid. In affections of the kidney and cephalalgia, it often does good, and no patient labouring under general derangement of the system, should omit the use of these waters. The Red Sulphur you are well acquainted with, and of these it is unnecessary for me to say any thing, yet I cannot avoid adding that their power and control over pulmonary disease, is such as the profession at large should not be ignorant of. The Grey Sulphur has been recently brought into notice by Mr. Legare, one of our townsmen, long and favourably known to all of us, as the Editor of the *Southern Agriculturist*. Of this water, I know nothing personally, but my friends, who visited it during the last summer, speak in exalted terms of it. It has, they say, a powerful effect on the pulse, and of course, will be very valuable in pulmonary disease, and exerts no little control over the digestive organs. This Spring, from all I can learn, is destined, at no distant period, to rank amongst the best of the Virginia waters, and will, of course, command a large portion of the Carolina patronage, as well from its own virtues as the great estimate in which its owner is held in his native state. The Sweet Spring is a tonic water, and is useful in all cases of general debility; it is usually drank after the visit to the Sulphur Waters has been completed.

"The Hot Springs is a powerful remedy in cases to which it is applicable, but much mischief result from its improper use. In chronic rheumatism, it has no equal, and if it fails, the patient has no chance from remedial aid: it should always be used under the direction of a physician and the "boiler," (as one of the baths is termed) should be entered with great caution, and the room not left until all perspiration has ceased.

"The Warm Springs is a delightful residence, and the bath a luxury not to be imagined. Those who have enjoyed this bath, often recur to the sensations experienced while in it, years and years after the

period. It has, I think, no medicinal virtues, except in mild hepatic affections, and in all those cases in which warm bathing is desirable as a remedy. The keeper of the house at this place, is an estimable man, and no one will repent the time passed under his roof.

"Having given you a hasty and imperfect sketch of what I recollect of the effects of the Virginia Waters, I will only add, that the country is beautiful, the scenery enchanting; the accommodations good, and the climate far preferable to that of Saratoga or Ballston. When to all this we add that the country we speak off, is South of the Potomac, and that the people are as ourselves in all respects, is it too much to hope, that the thousands that are spent at the North, will ere long begin to flow and be poured out in this delightful and healthy country.

Yours, very truly, B. H."

In my next, I will give you an account of the Red and Grey Sulphur Springs.

I remain, yours, &c.

JOHN D. LEGARÉ.

On the Preservation of the Sweet Potato.

To the Editor of the Southern Agriculturist.

Dear Sir,—There is nothing connected with our rural economy, so truly perplexing and vexatious, as the preservation of our crops of sweet potatoes. This most valuable root can be raised to almost any extent among us, but owing to this difficulty, is less attended to, and less valued than it should be. Could we overcome this, they would be almost invaluable to us, but at present, the loss sustained (seldom less than one-fourth, and often equal to one-half of what is put up for winter consumption) acts as a complete bar, and not more is grown than is calculated barely to support the slaves on the plantation during the winter months, and none for the feeding and fattening of hogs and cattle, than which, we have nothing better fitted, as is known to every planter in the Southern States.

The advantages enjoyed by England in consequence of the introduction of the turnip culture, is thought to be almost incalculable, rendering many districts which were poor and but thinly peopled, rich, and thickly settled with flourishing farms. The Irish potato has proven to Ireland, a blessing, which can scarcely be justly appreciated. Yet each of these, as much as they are deservedly thought

of, are less valuable as food, both for man and beast, than the sweet potato. This has been abundantly tested in these States, and is a fact so well known, that I have never heard it doubted, and will not, therefore, take up your time in dwelling on it. The main point to be considered is, whether they cannot be preserved without incurring such heavy losses as we do now. I acknowledge this seems almost impossible, and yet we ought not to despair.

I have known almost every mode in common use tried, and with results so variant as to puzzle us, and convince us that we had not as yet discovered the true secret on which their preservation depended.—Some place their potatoes in houses (built of puncheons) fill up as high as they can conveniently, fasten up the door, and never permit it to be opened until wanted for use. In this way, they keep in some seasons remarkably well, and what is somewhat astonishing, generally best, when, by the other modes the loss is heaviest. Others again, place them in similar houses, but keep the doors constantly open, except in very cold weather. Others again, build small fires daily in these houses (sufficient merely to dry up the moisture, and not to heat the house) until a certain time, and then discontinue it, and by this mode more generally preserve their potatoes than by any of the preceding. Others again place their potatoes in heaps of from 10 to 20 bushels, and cover them over with straw, corn-stalks, and earth. Others make still larger heaps, having a pole inserted in the centre; around which they are piled, to a considerable height, when the hillock is enclosed with straw, corn-stalks, and earth, and the pole is removed, and the opening at top covered either with a piece of board, or pine bark to keep out the rain. The object in inserting the pole, and afterwards removing it, is to leave a vacancy in the middle of the heap, through which, the heat and moisture can escape. I have never tried this mode, but it is highly spoken of.

From the above sketch, you will perceive, that we are by no means agreed, as to the best mode of preserving sweet potatoes; but we all agree in this, that the loss is considerable, and that it is highly desirous that some better mode should be discovered. The first point,

however, which we must ascertain is, the cause of this immense loss, occasioned by their rotting. Some attribute it to cut or bruised potatoes being mixed with the sound, but I have had heaps of cut potatoes keep just as well (sometimes better) than those which were not. Others, again, attribute it to their being dug after a frost, and are, therefore, anxious every year to get them housed before this event takes place; but I have never understood that these preserved their potatoes better than their neighbours, but on the contrary, they often experience heavy losses, from the weather becoming warm after they were housed. Others, again, are on the other extreme, and will not permit a potato to be dug until a frost has checked the growth, and consequently long before they are all housed, they have had several severe frosts on them, and those whose ends are exposed become frost bitten. The advocates of late digging, give as reasons, first, that the increase of the crop, is beyond all comparison, greater in the last four weeks, than during any other time, and moreover, that a frost is necessary for the better maturation of the root, on which its preservation, in a great measure, depends. The first, I believe, to rest merely on opinion, and although I do not think that the vines being killed, the roots are injuriously affected, yet neither do I think it necessary: for if a certain degee of maturity was necessary for the preservation of these roots, how shall we account for the very smallest which are reserved for seed, keeping very often, (I might almost say always,) far better, than those which have been selected for eating, and why is it that those which we designate as "*root potatoes*," and which are more matured than any of the preceding, keep worse than any, in fact, are so difficult to be preserved, that few ever think of digging them in larger quantities than barely sufficient for present use.

Thus, it appears, that we all differ as to the immediate cause. For my part, I cannot but think, that the prime agents are heat and moisture: these, we know, are sufficient to destroy much less perishable materials than potatoes, and it is well known that both of these are produced, to a great extent, in every heap of potatoes when of any size, and when in such quantities as to fill a house, it becomes obvious to our senses. Of this, any skeptic may easily satisfy himself by merely going into one of these houses; when the moisture trickling down the

poles, and the warm damp feeling, however cool the external air, will be evidence enough of the correctness of what I say. To obviate this, some have small fires (as we have before noticed) kindled in the front part of their cellars or houses. The principal object is, to fill the house with smoke with as little heat as possible, and consequently, those materials are mostly used which give out much smoke whilst consuming. In this way one of the agents is removed, and the other, perhaps, modified. Be this as it may,—this, at present, has been the most successful plan, that I am aware of.

If, then, heat and moisture be the principal causes of the decay and consequent loss of such large portions of our crop, (and really, I scarce think any will doubt this) our attention should be mainly directed to getting rid of them, and it becomes a query of some moment to us, how this can be best effected on a large scale. The use of small fires and smoke, although remedying the evil complained of, yet does not effectually remove it, for the moisture which rises to and above the surface of the heap, alone, can be dried or carried off, and, consequently, those in the centre, at least, if not those also, at the bottom, are liable to rot.

The plan, which occurs to me, as being most likely to obviate these difficulties, has at least simplicity to recommend it, and moreover, has been successful when tried on a small scale. It is nothing more than to have a quantity of sand intermingled with the potatoes, and this would, perhaps, be as well effected, by making alternate layers of sand and potatoes as any other. If dry sand could be procured, so much the better, but in all my experiments, I made use only of that which was at hand, without regard to its being moist. Of course I would not use it, if I could avoid it, immediately after a rain, or when wet. The way I would proceed, would be this: I would select an elevated spot for securing them where they would not be injured by moisture, should it prove a rainy season,—in addition to this I would raise a slight platform of earth, so that the first layer, at least, should be several inches above the surrounding surface. On this, I would place a layer of potatoes from six to twelve inches deep: (the first being, perhaps, preferable,) over this, I would spread a layer of sand, getting as much of it among the potatoes as possible. In fact, I believe, the preservation of the crop, will be in some measure, in proportion as this

admixture is more or less complete, and if it were possible to surround each potato with sand, very few, indeed, would rot, which were not injured either by frost or some other cause before they were packed away. On this sand, another layer of potatoes should be placed, and then more sand, and this should be continued until the house is filled, or the hill made high enough. The whole should then be entirely covered with sand, to the depth of several inches in the house, and at least six inches if exposed in hills to the weather. In this, you will observe, that I have omitted pine-straw and corn-stalks, so much used in putting up this crop. The reason for this is, that I believe them more injurious than useful; I would on the contrary carefully exclude every thing of a vegetable character, and have as near as possible only pure sand to cover the potatoes. I now proceed to give the rationale of this proceeding.

It is well known that whenever any vegetable substance is collected together in considerable quantities, it is liable to become rapidly decomposed, if it be moist, but if perfectly dry, any quantity may be collected together, without its undergoing any material change, and that it can be kept in this state for some length of time, provided moisture be carefully excluded. This is familiarly illustrated with grass and hay. If the grass whilst yet green, and consequently containing moisture, be placed in heaps, it soon heats, ferments, and rots, but after this moisture has been expelled, and it becomes converted into hay, it may be packed in any quantity in houses, and there kept for years with little, if any change. This is much the case with potatoes. When first dug, they are full of sap or moisture, even to the very epirdermis, and in this state they are taken and carried, (very often in carts or wagons) and thrown in large heaps either in a house, (where of course the confinement is greatest) or in the open air, where at least they have a better chance of parting with a portion of their heat and moisture, though as experience shows not with enough, unless the hills are small. Now any vegetable substance brought together in this state, would go through the regular processes of heating, fermenting, and finally, rotting, and why should we expect an exemption in this case from the laws of nature. There will be none, and we must only endeavour to remedy what we cannot prevent; or rather neutralize

one law by another. To effect this, we must either separate the particles so far from each other, that they cannot aid each other in producing this effect, or interpose some substance, which neither ferments or undergoes decomposition. Were we able to isolate every potato, and at the same time protect it from the action of the atmosphere, it is possible that they might be preserved for some length of time in a sound state, when originally put up so. But this is impossible, and our next inquiry should be, whether we can conveniently interpose some substance which will not ferment or decay. This can be done with sand, and if, instead of making alternate layers as deep as we have recommended, they should be made only so deep as to permit the sand to intermix and fill up the interstices, there is no doubt, in my mind, but that our loss would be trifling—that there would be a small loss is certain, for at harvesting, the ends of many are exposed and get frost bitten, and others are bruised in the carrying from the field and piling them up,—but these as they rotted would not affect materially, (I scarcely think at all) the remainder, being surrounded by sand, which would absorb and confine the moisture as it escaped. To sum up all in a few words. The sand being an imperishable substance, by being freely mixed among the potatoes will prevent their heating, fermenting and rotting, in as much, as in the first place, they will be separated from each other by it, even though they be piled in layers, though not so effectually as could be desired. In the second place the moisture given out in the form of hot vapour, which hangs around and injures each, will be condensed and absorbed, and the extraneous heat be permitted to escape through the numerous interstices of the sand.

But this is not, Mr. Editor, altogether theory, nor do I claim any merit for suggesting the use of sand, further than the mode and object of the application. Sand has long been used for preserving fruit, (especially apples) through the winter, and it is but fair to infer that it will act with equal effect on potatoes. I do not, however, leave this altogether to inference but have acted on it, as I have repeatedly sent sweet potatoes packed with sand in barrels to my friends at the North, which have arrived in good condition, when I never could send them merely placed

in barrels, even to New-York, without the greatest part rotting.

In conclusion, I will detail a small experiment, which although accidental, yet serves to confirm what I have advanced.

It became necessary for me to spend the whole winter together with my family in the city. Having made a fine crop of potatoes, I wished that we should enjoy at least a portion of them, and at the same time, did not feel disposed to purchase what was in such abundance on the plantation. As opportunities would offer but seldom to bring them from thence, I determined to pack some up in barrels, and knowing from sad experience, how rapidly they decayed when thus packed alone, I had a parcel of sand got, and placing a small quantity at the bottom, proceeded to place the potatoes in, packing them as close as possible, and then filling the interstices with sand, as we advanced. The only care taken was that none should be bruised, and that all specked and rotten potatoes should be excluded. When the barrel was filled, we placed about an inch of sand at the top, having first shaken them so as to have every part completely filled with the sand. In this state they were headed up and sent to the city. I do not believe that I had a potato less in the barrels, than if I had not used the sand, for they were placed in first and the sand afterwards thrown in and shaken down. I took no care to have dry sand, but used that which happened to be handy at the place where they were packed, and the most of it was moist. These potatoes lasted us until very late in the spring without sprouting or shriveling, as is always the case when kept late, nor did I loose many by rotting, perhaps not more than half a dozen to the barrel, and this I had every reason to expect, for the potatoes had been harvested several weeks, and in selecting them, the heaps were overhauled. Those which rotted, in all probability, had received some injury or had the seeds of decay, though not obvious at the time.

Thus, Mr. Editor, I have thrown together a few ideas, on what seems to me to be of more importance than most of our planters regard it. I hope, however, that some of them, at least, will bestow more attention on the subject. It is of great importance to us to preserve what we have laboured so hard to obtain, but under present management, a very large portion of every potato crop is lost.

Let us then unite, and as a commencement, let us communicate such experiments and observations as each has made for publication in your journal. We will, no doubt, collect some most valuable information, and if we can hit upon the true mode of preserving the potato crop, we shall have done the State some service indeed.

I remain, yours,
RUSTICUS IN URBE.

Charleston, December 23, 1834.

Notice of the Mango, (Sechium edulis,) with a short account of its culture and use.

Mr. Editor,—The *Sechium edule*, or Mango, as it is called in this city, (though it bears no resemblance to the fruit of that name) is a native of the West-Indies. A vegetable, growing on vines which run to great length, and bear profusely, late in the fall. In shape, it bears a strong resemblance to a pear, is either green or white, and in flavour resembles the spring squash, and is cooked in all the modes in which that vegetable is.

Although this delightful vegetable is to be had in almost any quantities in our market in the months of September and October, and although the culture is extremely simple, yet I have never met with it out of Charleston, except at such places as I have sent it to,* and without a single exception that I am aware of, it was new, if not altogether unknown before I sent it. This has been the case, not only in this State, but at the North, as well as in England and France, in both of which I have correspondents.

The mode of culture is so simple, that I hope this vegetable will ere long be found in every garden. I am certain it needs only to be known to be attended to. The process is simply this. In the fall of the year, (as late as possible) select some of the largest fruit on the vines, and reserve them for planting out early in the spring; they must be kept during the winter where they will not be injured by frosts, but not in too warm a place, or they will commence growing, and perhaps, exhaust themselves. It has been usual, to keep none but those which showed the bean at the lower end, but I have found this is not necessary: in

* I do not pretend to say that it is not to be found elsewhere, but only that I have not met with it.

fact, I would rather that they be not so far advanced, for they very often commence growing with all the precautions that can be taken, and send out shoots several yards long, and consequently exhaust themselves greatly, and sometimes dry up and perish before the spring arrives, but should this last not happen, you may still plant them, only taking care to prune the vine down to a couple of eyes when put into the ground.

As soon in the spring as you can safely venture, have a hole dug, into which empty a wheel-barrow of good well rotted manure, and have it well intermixed with the earth. In each of these holes, which should not be nearer than ten feet, plant one mango, covering it about three inches deep, it will soon shoot up one or two vines, and commence growing with great rapidity. It will be necessary for you now to provide a trellis, or arbour to run on, (the latter is preferable) and as it forms a beautiful and dense shade, it answers well for this purpose. It can also be trained to lattice-work fixed to a piazza. But wherever it is trained it must have a good deal of space allowed, as one plant will cover from fifteen to twenty feet square in the course of the season; and, so vigorous is its growth, that it requires no care during summer, except to keep the weeds from it.

In September it will begin to bear, and in October be in full bearing, when, may be had as fine a vegetable as is grown. So strong is the resemblance (in flavour) to the squash, that it is almost impossible to detect it by taste. It is cooked exactly like the squash, and may be kept by being packed in dry sand during the whole winter, and without further care, than keeping them in a moderately warm room. When kept without this precaution, they shrivel up in consequence of loss of moisture, and do not eat as well.

When a frost is expected, some fresh stable manure should be heaped over the crown of the old roots, and thus left until killed. Protected in this manner, they will survive the winter, and being perennial, will every year amply repay the little trouble given. I know one which lasted several years, (six or seven I think) and was finally lost by the carelessness of the gardener. This is, however, a matter of no great consequence, as they can be so easily replaced by planting the fruit.

Yours, &c. J. D. L.

PART II.

SELECTIONS.

Cotton—its Introduction and Progress of its Culture, in the United States.

(Concluded from page 46.)

Short Staple Cotton.—The short staple cottons, of every part of the United States, are derived from the first and second varieties of cotton; were found in the United States, from Virginia to Georgia, at the close of the American Revolutionary war, cultivated in small quantities by the poorer classes of the white population of the country, to be mixed, in their domestic manufactories, with their own wool. The cotton, for this purpose, was separated from the seed by the old and the young, with the fingers, sitting around their evening fire, and was spun by the hand wheel, to serve as a warp, to be filled with the wool of their own sheep.

These two descriptions of cotton, that is the common herbaceous cotton with smooth leaves, No. 1 in the classification, and the 2d, or hairy American cotton, were cultivated by very many for domestic purposes, but I have no where seen or heard of any attempt at producing either of these cottons for sale before the introduction of the West-India seed, and the increased attention this circumstance produced to the subject. Whether indigo and tobacco, the great staples of the Southern provinces, were preferred to it, or whether (which is probable,) the difficulty which was found in separating the seed from the wool by any other means than the hands, had checked cultivation, I know not, but probably both combined. Three or four years since, the writer of this paper, having written a letter upon American cottons at the desire of a gentleman in England, ventured to suppose that these two varieties of cotton had been introduced into Virginia by some one or other of the early governors of that province while under the patronage of the crown. Subsequently to that time, in some of the long discussions within and without the halls of the American Congress, upon the American system of duties, it has been discovered that cotton had been introduced many years since into Virginia, from the Turkish dominions in Asia, probably from Smyrna; and the cotton seed stole along with the Virginian colozination of the Southern States; for in truth, the Southern States of the American Confederacy are colonies of Virginia more or less directly derived, while the Northwestern States of the American Confederacy are colonists more or less direct, from the New-England States, with all of their industry, and much of that economy which qualifies them the better

for being farmers where little is risked and patient industry is sure of moderate reward, than in being planters or growers upon a large scale of products, which sometimes well reward enterprize, but too often disappoint the sanguine expectant, and send him homeless and houseless, in his age, to seek still farther south or farther west for cheaper and for fresher soils to labour upon. But wherever he roams, however unfortunate his condition, the cotton seed, like the maze seed, is carried along with him. The one supplies him with bread, and the other supplies the material for his clothing, or affords him the means of buying it. It is this roving disposition of the Southern American people, who carry their cotton seed to seek for newer and for fresher fields, as the Tartar of the steppes drives his flocks to browse on newer and on greener pastures—it is this almost mysterious love of change of situation that has in so few years, produced that wonderful revolution in the cotton trade of the world. Without this roving propensity, centuries could not have produced the effect that twenty years have accomplished. Other Countries are as well adapted to cotton as the United States. There are the States along the Mediterranean Sea, there are many of the countries of Asia, there are the many islands of the Eastern Sea, but above all, there is wide-spread Brazil: these were all labouring upon cotton before the American people thought of it. But what then? The spirit that moved along the wilderness was wanting; the Pacha of Egypt may plan, other jealous governments may offer bounties and rewards, but that is wanting; that is wanting to the seekers after perpetual motion, life, and self-motion, in the mass that is to be acted upon. God has yet reserved to himself this vitality, and has neither yielded it up to the ruler or the ruled.

But to return from this digression, which it is hoped is not unnecessary, as the cause must ever precede the effect, and it was considered well to give the cause before we passed to the effects. As soon as the attention of the Southern States was called to the profitable cultivation of cotton, by a few persons along the shores of Georgia and Carolina, the cultivation began to be extended into the interior. The small quantity of cotton that had been grown for domestic uses, was exchanged for larger quantities to be prepared for sale. But the great difficulty to be overcome in the progress to extension, was to find out any instrument by which the cotton wool could be separated from the seed.

By this time various machines had been introduced for ginning the sea-island cotton, but all of them ended at last in two rollers revolving upon each other, either longer or shorter, and moving with, some more, some less, velocity. These rollers were but badly adapted to the hairy cotton or second variety, which soon began to obtain the preference in the interior of Georgia and South-Carolina, over the first or smooth leaved variety, and merited to obtain that preference, as giving when separated from its downy seed, a finer and stronger, although shorter fibre, and as perfecting its fruit sooner, but which it was almost impossible to separate with the rollers, because the down or fur upon the seed retained the seed hanging upon the roller, and denied admission to the rollers of the fresh cotton in the seed that was offered. Many plans were suggested, many substitutes for the rollers designed. All succeeded in part, but still they went on slow. Something was desired to do much in a short time: something that was strong enough to travel about without being broken to pieces, and light enough to move with its moving master. At last such a thing

was found, in Miller and Whitney's gin, probably not the best machine that could have been designed, but so operative to its end, so efficient to its purpose, that it took possession of the whole ground; from thenceforward no other machine was sought for, and Miller and Whitney's gin is employed to separate the cotton seed from Virginia to Louisiana, save where the roller gin is used, and its use is now altogether confined to the sea-island cotton, whose superior value is supposed to warrant great increase of labour necessary in that mode of ginning. Miller and Whitney's gin was designed by Mr. Whitney, and executed at the plantation of Mr. Miller, sixteen miles above Savannah, about the year 1795, and it seems to be derived from two machines already used upon cotton, a kind of cylindrical whipper, and the circular cards, before that time introduced in manufacturing cotton; a wooden shaft or roller enclosed within a wooden box. This roller or shaft has at every inch of its length a steel blade or saw, about a foot in diameter; above these saws is a box containing the cotton in the seed. The box has the bottom of mettle slits, through which the saws pass about an inch, and pulling off the cotton, but sometimes cutting the fibre as it passes. This revolving of the saws carries the cotton in the box gradually round until the seeds contained in the box are freed of the wool attached to them, when it is emptied of the seed and re-filled with fresh cotton; it too often leaves some of the fibre behind it, which diminishes the quantity as well as injures the quality, so much so that the estimated difference of the products in these two modes of ginning are, with rollers 300lbs. to the 1000, and 250lbs. to the 1000 with Miller and Whitney's gin. This gin having at last given a cheap and expeditious mode of taking the wool from the hairy American cotton, (for a gin that cost ten pounds sterling will clean a bale a day with a single horse acting upon the gin, with a band wheel which any man can make for himself,) the cultivation of this description of cotton diverged in all directions around Georgia as the common centre: it went north into the two Carolinas; it went west into the hill-country of all the Southern States; it was found capable of adjusting itself to the soil and climate of the interior country, which the Anguilla cotton had not been adapted to; still the fibre of the hairy or short staple cotton is better near the sea than in the interior. Above all, it is found to be most productive in alluvial soils that are a little touched with salt, as are some of the districts of Louisiana, where the rivers rising in the Rocky Mountains draw some of their waters through the salt and arid plains which separate the waters of the Arkansas from the waters of Red River, where these two varieties of cotton, and a cotton that is possibly a hybrid between them, have arrived at the greatest perfection. It is there that soils which are deeply tinged with red, and heavily seasoned with salt, which all the tributary streams of Red River, flowing in from the north, bring with them, give forth the most abundant crops, of the best quality of these descriptions of cotton. Directing myself by the information received from one or two friends who have property there, I should say, with reasonable diligence and attention to the object, 1000lbs. of seed cotton, or about 250lbs. of cotton wool may be expected to the English acre, while the average products of the hill lands from the Mississippi to North-Carolina, should not be taken at more than 500lbs. of seed cotton, or half the quantity, nor do I believe there is any material difference upon the great scale of products through this wide extent of country, judging for myself from personal observation, for I have pas-

sed through all these districts, yet scarcely a year passes without the newspapers announcing some new discovered land of promise within these wide limits, themselves misled by some single or partial result, or stimulated on by land speculators, a curse of no common character to a new country. But in whatever cause originating, the evil is the same. These rumours fall among a people already heated with a desire of change—a people quite sensible to present evils, but not reflective enough to hold in remembrance, that every wave of the hand without necessity, and every momentary evolvement of time without usefulness, is a waste of power and waste of time irreclaimable to humanity. The system of agriculture through all those districts, is essentially the same. You find the Virginian upon the Red River; you find the North-Carolina man, the South-Carolina man, and the man from Georgia, along side of him; any improvements, any increased quantity of product, by any new course of cultivation, spreads like the fire of the American prairie, a spark has carried it, and enkindled it, far in advance of the mass of flame that rolls after it. Any substantial improvements, therefore, that is made in Virginia, or Georgia, from this extension of mind, from this intermingling of men, is as likely to be reflected back upon the intermediate country from Red River, as to reach it, from its first source. The system of cultivation is, therefore, the same: the moment the cultivation of cotton spread into the interior country, from the shores of Georgia and South-Carolina, the hand-hoe was exchanged for the plough. The latter instrument had been employed at all times, and in all cultures in the hill country of the Southern States; in no other agricultural country were oxen or horses cheaper, in no agricultural country were soils freer for the plough-share, but it was not adapted to the sea-coast, because the land is so little above the waters that ebb and flow, that many drains, inconvenient to the ploughman, are required to carry off the surface waters; the trees, too, of necessity, send their roots along the surface, rather than vertically in quest of moisture, and many of them like the live oak, are scarcely destructible by time. They, too, obstruct his course; but above all, the plant under cultivation sends its roots around in quest rather of nourishment than down in quest of moisture, and must not be too rudely dealt with; these various causes, have finally, after long experience, fixed the hoe-husbandry upon the sea-coast, and carried the plough-husbandry into the hills. The short staple cotton is, therefore, as exclusively cultivated by the plough, as the sea-island cotton is exclusively cultivated by the hoe. The manner of treating the plant is really the same, the hoe dressing the land more neatly and garden like; the plough breaking up the land more radically, and extending far more widely its operation, for the quantity of force employed. The consequence has been, that while four English acres is the quantity cultivated upon the sea-coast of Georgia and Carolina with the hand-hoe, eight acres is about the quantity cultivated of short staple cotton in the interior with the plough. It is the ridge-husbandry in both instances that is now pursued, more neatly executed in the first instance by the hoe, and more roughly by the plough in the second, but still the same. The month of April is the best time of planting either variety. The distance between the ridges is most generally five feet, the plants left in the drills, varying from 6 to 24 inches, dependent as before stated, upon the expected growth of the plants. Two other circumstances contributed to aid the cultivation of short staple, extrinsic of soil or real products. The winds of autumn

are far more violent upon the sea-coast of Georgia and Carolina, than in the interior country, and the capsules that contain the sea-island cotton, expand more than those that contain the short staple, so that the first has to be gathered much more frequently from the fields than the last, or it falls to the ground, and is lost. The consequence is, the general gathering to the labourer, per day, is more than twice the quantity of short staple, than of sea-island, for it is allowed to hang upon the plants, until they are white with the open cotton, so that there is only two, and at best, three gatherings of the one, to ten, or twelve scanty gleanings of the other. This one circumstance, more than any other, gives to the grower of short staple cotton, the power of something more than duplicating the quantity of cotton wool produced, by the same quantity of labour expended.

But it is time that we should look back, and see if there has been any thing omitted, necessary to be known, in the cultivation of the cotton plant, or in preparing the cotton wool in the United States. Cottons of various kinds, grow well and perfect their fruit, from the southern borders of Virginia to the Southwestern streams of the Mississippi, a space of thirteen hundred miles, and from the sea, for two hundred miles into the interior, through this wide space of country, in every soil, whether of clay, or loam, or even sand, the cotton plant will grow, and produce its seed, and wool its accompaniment, provided the waters are kept well drained from the surface of the land. The quantity of product will of course depend upon the soils, whatever they may be, containing these ingredients which constitute fertility in all countries, which neither experiment, or the philosophy of chemistry has yet been able fully to discover or define. The mean quantity given, of 100lbs. of sea-island cotton wool to the English acre, and of 125lbs. of short staple cotton to the same quantity of land, we believe, not materially wrong, but the quantity of labour to bring forth these results is very different. The sea-island cotton is cultivated neatly by the hoe, the short staple more roughly by the plough, still it is, or should be, the ridge-husbandry in both instances. The plants are left to stand in drills upon the ridge, at distances from each other, graduated, as before stated, to the expected growth of the plants, from six inches to two feet from each other, and bearing without injury to stand much nearer than at first sight may be imagined, for the cotton plant does not occupy much space, with its roots, descending into the ground, and not over the surface, like white or grain crops, and drawing like all large leaved green crops, much of its nourishment from the atmosphere. It is not an exhauster of soil, shading and protecting it from the sun, and soon by its decay, or by its combustion returning almost as much as it has taken away; but from the density of its shade, and the size and swell of its roots it soon makes the soil too loose to sustain the plant, and the continued culture of the same soil, brings on a disease in the plant, greatly resembling the blight in wheat, and leaving a propensity in the seeds of cotton to extend the evil, like the propensity in blighted wheat to extend and multiply; nor have I ever doubted, that in both instances, that the evil had originated in insect depredations, for although Sir Joseph Banks discovered a fungous attaching itself to blighted wheat, I still believe, that the microscope discovered in that minute parasitic plant, the effects of injury previously received from something that lived, and moved, and had animal being. Fire, therefore, I have always believed, and have always acted upon that belief, is the best security against this increasing and extending evil—all the

weeds and grass that are on the land should be burnt upon the surface of the land, leaving no vegetable matter to conceal and protect the germ, and by fermentation, to give heat and life to it: it is the neglect of this course which I think has been the cause, that this evil, under various names, rot, and rust, and blight, has spread so widely as it has done, within a few years.

There is no plant that requires the interchangeable husbandry more than the cotton plant, and there is no country, where that husbandry is more essential than in the Southern States. The cotton requires continued cleaning during the droughts of spring, and the heats of midsummer; these cleanings, together with the shade and rapid growth of the plant, break up the soil, and leave it to be carried away, by the first violent autumnal rains. The best remedy is, to give to the fields of cotton, intermediate crops of grain—as good a series as can be adopted, is cotton, rye and wheat, where the soil is fit for it, pasture, and again cotton, a more extended rotation might be adopted; but as root crops should be avoided in series with cotton, this simple tri-annual course, with manure applied during the grain year, to as great extent as may be convenient, will keep the field without material decay. When cotton was first introduced, the growers were misled as to the necessity of this change, by observing that the cotton plant upon new lands, grew large, and gave little fruit, and that it improved for the second and third year in productiveness, they unfortunately pushed the culture too far, until possibly to this cause, many of the diseases that have afflicted it in its growth may be attributed.

In a preceding part of this letter, the probable mean results, for these last fifteen years, in growing sea-island cotton, has been taken, at 90 dollars, or about 20 pounds sterling to the labourer, and taking as we have already done in this letter, the medium crop of short staple, at 125lbs. to the English acre, and eight acres of this cotton, as cultivated by the plough, it will give 1000lbs. of short staple cotton wool to each labourer employed upon it, which, for the last seven years, may have given to the grower, a mean return of 10 cents to the pound, or 100 dollars for the year's work. There are exceptions, unquestionably, to these estimates, a few men have received much higher prices for their sea-island cotton, and a few men have raised much larger quantities of both descriptions of cottons, to the acre, than are given; but exceptions can never serve as productiveness of a whole country. The besetting sin of agricultural statements are exaggerations; and this arises from the simplest of all causes, men do not go about measuring the fields, and weighing the products of their neighbours, but they leave to themselves, to measure and weigh. But it too often occurs, that he has done so, in imagination, before he was called to do so, in reality, and vanity mingles with disappointment, in denying his consent to go back, to unravel, to explain, or confirm the result. Why then, it may be inquried, has a whole people so readily and so greedily adopted a course of cultivation, leading to so small individual benefit? There are many reasons; but there is one, sufficient to the end. It suits their wandering habits, it requires no great time to grow, it requires no great expense to prepare, and it will command money, less or more, wheresoever grown. But should we here pause to inquire whether this delusion, will continue for always; whether 5,000,000 of Southern American people, will continue to labour for the benefit of others, rather than for the benefit of themselves, I think they will not, unless cotton gradually rises to what is its real value. Is it not

finer—is it not lighter—is it not more easily spun, and more easily woven than other wool? And does it in its various qualities sell for as much? Does it sell for as much as fur, as silk, as flax, or even hemp? It does not; and yet there is not one purpose, to which any one of these materials can be applied, to which cotton cannot as well, or even better, be applied. From the Court Lady, that is fluttering around the throne of Louis Philip, to the ship that sails across the sea, all are better clothed in cotton, than they can be clothed in any thing else; for the one cannot be more pure or stainless, than the robe she wears, and the night dew that falls upon the sails of the other will not rot or destroy them, but will swell and thicken them to the wind. Cotton has yet to be applied to many purposes to which it has not yet been applied, if it were possible to suppose, that the supply could keep pace with its multiplying uses; but the American people have at length, reached, in the cotton region, the bounds of the American empire. Tribes of red men will separate them from Mexico. The roll of population to the West will be stayed. Within the present limits, the labourer whether white or black, has full employment, and none of them, more unprofitably, than those employed in the cultivation of cotton. Rice gives a better return; sugar in many districts gives a better return; wheat in its appropriate place, gives a better return; indigo, an ancient staple of the country, would give a better return. Those hills that are now wasting away with continued summer ploughings, under cotton, will, before many years, be shaded and protected by mulberry trees, feeding silk worms, that will give a better return, to those that watch and labour upon them. Cotton must take its real and relative value, among the gifts of God—or its growers will leave the wrangling governments, that have done what they could do to destroy it, to quarrel over its remains.

But the writer of this letter, has no where permitted the pen fully to express, all the mind felt upon the subject.

* * * * * * *

The present age is too enlightened for the cold, dull process of reflection, it is occupied with the march of mind—well: let England, with the march of mind, look to where it leads!

It would have been easy to have added to this letter, tabular statements of the progressive increase, in the growth, and in the manufactory of cotton wool; but every bookseller's shop, in every town in England, will give them.

THOMAS SPALDING,
Of Sapalo Island, near Darien, Georgia.

On Chemistry, as connected with the developement and growth of Plants.

By the Author of the Domestic Gardeners' Manual; in a series of numbers; published in the London Horticultural Register; which we intend to copy into this Journal.

I MIGHT, perhaps, be acting more in conformity with custom and routine, were I to enter, at once into the investigation of Earths and Soils. These are the supporters of almost every individual subject of the vegetable kingdom, they form the matrix wherein the embryos of life are developed, and in which the materials of terrene nutriment are so laborated and distributed as to supply the advancing radicles with appropriate food. Again, they are substances upon which the

art of the chemist has been legitimately exerted; and whose nature and components he has, by experiments and analysis, pretty accurately determined.

But I greatly prefer postponing the inquiry into the constitution and offices of the earths, until I have excited the reader's attention to those mighty natural agents which are constantly at work, night and day, and during every moment of the existence of the vegetable vital being. These agents are Water, Air, and Light; the last is perhaps the most directly influential, but the first, I conceive, has a prior claim to consideration, in as much as in all probability it stands before the others in the order of creation. I shall therefore make the subject of this paper, an inquiry into the nature and agency of WATER.—How trifling a period of time has elapsed since water was believed to be a pure, simple, uncompounded element; and yet its decomposition and re-formation have been going on without interruption or cessation throughout nature, ever since the developement of the first ray of light, The compound nature of water was determined beyond a doubt by several philosophers, about the year 1781, when the immortal Lavoisier detailed his discovery, in the Memoires of the French academy.

A series of experiments, analytical as well as synthetical, were decisive, not only of the real components of the fluid, but of the proportions, by weight and measure, almost to exactitude, in which they unite to produce it.

By *Analysis*, from two Greek words, ανα and λυσις, (a dissolution of, or bringing any substance or thing back to its first principles,) chemists express those processes which separate and reveal the parts or components of bodies; and by *Synthesis*, from συν and θεσις, a placing or bringing close together, they designate the re-uniting of the parts or constituents separated by analysis, so as to re-produce or form afresh the original substance that had been operated upon.

I shall not multiply chemical authorities, but confine my quotations chiefly to the elements of Lavoisier, that great father of modern chemistry; who, though doubtless in error upon some points, may safely be ranked with Newton, Boyle, or Linnæus. What they were in philosophy and botany, Lavoisier was in chemistry; for he laid the foundation of all the new and brilliant discoveries which have added lustre to the present century.

The first analytic experiment that led to a decisive result, is described in the 137th page of the first volume of the edition of 1802. It may thus be abbreviated; for I cannot pretend to refer to the detail of the plates and machinery, figured and described. The reader is earnestly requested to obtain a view of the work itself.

A glass tube was fixed across a furnace for holding ignited charcoal; a slight inclination was given to the tube; and to the superior extremity of the tube, was fixed by lute, a glass retort, containing a determinate quantity of distilled water. Into the tube, twenty-eight grains of charcoal, broken into smallish pieces, and which had previously been exposed for a long time to a red heat in a close vessel, were introduced. To the inferior extremity, a worm (or spiral pipe of a still,) was firmly fastened aud luted. This worm was adapted to a doubly tubulated bottle; to one tubulure or orifice of which, another bent tube was fixed in such a manner as to convey any aëriform fluids or gases that might be disengaged into a proper apparatus for determining their quantity and nature.

Things being thus arranged, and every precaution to obtain accuracy observed, the charcoal in the furnace was lighted, and such a fire maintained in another furnace under the retort, as sufficed to keep the water therein contained, continually boiling, and thus to force the steam into the tube that passed through the burning charcoal. "After the operation, we find," says Lavoisier,—"nothing but a few atoms of ashes remaining in the tube, the 28 grains of charcoal having entirely disappeared."

The products of the experiment were two gases, of a nature totally different from one another. The charcoal, situated as it was,—that is—within the glass tube surrounded by fire, had decomposed the aqueous vapor which was conveyed through it; and uniting with one of the constituents of the vapor, passed into a receiver, and was found to consist of 144 cubical inches of carbonic acid gas, weighing 100 grains. This heavy gas had before been proved to be composed of carbon and oxygen; therefore, oxygen was found to be one of the constituents of water.

The other gas was observed to take fire, "when in contact with the air, by the approach of a lighted body;"—it occupied 380 cubical inches, but weighing only thirteen and seven-tenths grains. This was found to be hydrogen gas, and therefore, it was determined that water was composed of oxygen and hydrogen. The water expended in steam was eighty-five and seven-tenths grains: it had been proved by preceding experiments, that carbonic acid contained seventy-two grains of oxygen in every one hundred grains; therefore, as the carbonic acid gas produced (being one hundred grains), had taken seventy-two grains from the water,—and as the hydrogen gas weighed thirteen and seven-tenths grains, the eighty-five and seven-tenths grains of water evaporated from the retort, were accounted for, and the important chemical fact established, that eighty-five and seven-tenths grains of water "are composed of seventy-two grains of oxygen, combined with thirteen and seven-tenths grains of a gas susceptible of combustion." This gas was subsequently named hydrogen gas, for the reason assigned in the introductory article, page 436, Vol. II, of the *Horticultural Register*.* In the present state of widely diffused chemical knowledge, it will scarcely be needful for me to state that a variety of experiments by Lavoisier and his contemporaries, and by numberless chemists since his decease,—wherein many different substances were made to act upon water, have proved, beyond a doubt, that the analysis of the fluid have invariably led to the same conclusion. It was also found that electricity excited by the common machine, was capable of separating the two constituents; and the decomposition of water by voltaic or galvanic electricity, forms one of the most beautiful and decisive proofs of its compound nature, and also of the general correctness of Lavoisier's deductions. If any doubt could by possibility have remained, it was removed by the converse of these experiments;

* We have not inserted this artitle, it being in explanation of *terms*, and assigning the writers' reasons for publishing these Essays, we are induced, by way of explanation, to insert the following:—*Ed. So. Agr.*—"*Hydrogen.*—This term also originated with Lavoisier and other celebrated French chemists; it was applied to that peculiar base or radical which, when in combination with oxygen, constitutes water. The word is compounded of *(udor)* water, or rather *(geino)* I generate; it indicates the generator, or source of water. The term hydrogen, as was the case with oxygen, designates the solid or base; and what this is, is unknown to man, but hydrogen gas, is an aeiriform fluid, the lightest known matter, perhaps, of all things that possess weight. It is usually said to be a compound of the base, and a certain definite proportion of caloric, or the matter of heat."

that is, by the recombination of the constituents, and the reproduction of the fluid "element." I shall quote the substance of one of the most simple, and yet striking operations, the accuracy of which I can vouch, by the result of mine own experience.

Into a large crystal balloon, or globular glass, a certain given portion of carefully purified oxygen gas was admitted. A reservoir of the same purified gas was also at hand, from which the balloon might be re-supplied. This vessel was exhausted of its air, by an air pump, previously to the admission of the oxygen gas; and finally, by means of pressure, a small stream of hydrogen gas was made to pass into the balloon, which gas was immediately ignited by an electric spark. As the combustion proceeded, globules of water were deposited upon the inner surface of the globe, and these, enlarging into drops, ran down to the bottom of the vessel. I refer the reader to vol. I, page 144 of Lavoisier's Elements, for the particulars; suffice it to say—that it required eighty-five parts by weight of oxygen, united to fifteen parts of hydrogen, to compose one hundred parts of water. "We exerted," says the philosopher—"on that occasion, the most scrupulous attention to accuracy; and have reason to believe that the above proportions cannot vary a two hundredth part from absolute truth."

The compound decomposable nature of water, cannot be a question of doubt; the nature also, and proportion of its elements, are understood, as far as our limited knowledge will authorize this assertion; but there are depths and mysteries in all these phænomena, which are at present unfathomable and incomprehensible. How are the two gases held in union, and condensed into the form of liquid? By the abstraction, say the chemists, of their gaseous caloric which had previously kept them in a state of minute division! But can this be the fact? It is true that in the slow combustion of hydrogen, in an atmosphere of oxygen gas, a great volume of heat is developed; and in the case of the rapid combustion of a certain volume of the two gases blended together, a most violent explosion takes place. But then, light, as well as heat, is manifested, and what is light? How is that produced from two invisible, aëriform fluids, unless it previously exist therein.

I shall not here anticipate what I must refer to at large in a future paper. I shall only observe that, in order to produce light, heat, and water, from the union of the two gases, the electric spark, or actual fire, must be applied to them; otherwise, as I have seen, the gases may be blended in a vessel, and become wholly inactive and uninflamable, in a very short space of time.

The facts already ascertained lead to the following conclusions:

First. Water, by a variety of agencies, can be decomposed; it can also be re-produced by the re-union and deflagration of the two actual products of the previous decomposition, and that, to a nice degree of accuracy in respect to quantities and calculation; of these facts there is no question or doubt whatsoever.

Second. As analysis and synthesis tend to establish the nature of water, the proofs deduced from the experiment are irrefragable and decisive: the theory is therefore legitimate and not to be impugned.

Third. Though we can trace effects, we are still lost as to causes. One point however, is pretty nearly confirmed, namely, the universality of the distribution of light, of that all-pervading body, fluid, or essence, which is the source of that manifestation which chemists style caloric. To it we must look for the solution of all those mighty

phænomena which astonish the mind when it dwells upon the multiform transitions of water and its elements, when it reflects that, the bland, cooling fluid, which forms the basis of so many of our enjoyments, may be modified into steam, a floating vapour, rather lighter than air, or congealed into a solid mass of rock, hard as adamant, and equally capable of emitting flashes of ethereal fire. Again, that this fluid, which, properly applied, will extinguish fire and flame, may, with the utmost facility, be converted into gases capable of producing combustion, the light of which, shall vie with that of the sun; while the heat shall surpass in intensity, any that the uninformed human mind could have the faintest conception of.*

I must now hasten to the consideration of the agency exerted by water in the processes of vegetable growth and developement. This must be most important, for it is impossible that a body so susceptible of decomposition, and whose elements are endowed with powers of such extraordinary energy, could remain torpid or inactive. But one experiment of analysis remains to be noticed, because it will tend to introduce the subject of the agency mutually exerted between plants and water, and also to prove that the decomposition of that fluid must be perpetually, and without intermission, proceeding during the progress of vegetable vital action.

Let a glass globe be filled with water, and a sprig or two of mint, or the green leaves of almost any tree, or a growing entire plant, be then introduced. The globe is next to be inverted, and placed in a vessel of water with its neck downward, so that no air may enter, nor water escape.

The plant or leaves are thus immersed; and in this situation, the vessel being exposed to the direct light of the sun, the foliage is acted upon by the rays of light passing through the media of glass and water. Bubbles of air are formed on the leaves, which increase in bulk, till they rise to the top of the globe, and displace some of the water. The gas thus developed, is found to be oxygen, for it supports combustion in a very eminent degree. Chemists say that the hydrogen of the water combines with the plant; they consider that it contributes to its nourishment; and that, in proportion as the hydrogen is taken up by the leaves, the oxygen gas is liberated.

The fact is decisive of the agency of light upon vegetables; but I am apt to doubt the accuracy of the deduction. I think it quite as probable that the water is taken up by the vegetable, and the decomposition effected within the cells, by the agency of the solar light, the gas set free, being propelled through the oscular pores of the leaves, as that the leaves merely attract the hydrogen, and thus cause the liberation of the other component. Be this as it may, the result is one of great interest; and is connected with another, which will be noticed in a future paper, on the course of the vegetable fluids.

Every one knows that water is essential to the life and growth of plants; but a real mystery is involved in the consideration of the mode in which it acts upon them. Is water taken up in its simple, entire state, into the vegetable vessels; or is it decomposed in the soil, and

* I herein allude to the combination of oxygen and hydrogen gases, when brought into action by the blow-pipe. Thereby the combustion of lime is effected, accompanied by the most astounding splendour; and by the same machinery, under other circumstances, a degree of heat is produced of unequalled intensity.

assumed under the form of gas? Does it act simply as a solvent of the nutritive matters contained in the soil, thus enabling the processes of the roots to take up the essential qualities of those matters which otherwise could not find a passage through orifices of such infinite minuteness as those with which the rootlets are furnished?

These inquiries lead to the consideration of the following facts:—Many plants will strike root very freely in water, whether that be pure from the clouds, or the more compound fluid from rivers and wells, which usually contains vegetable matter, and some chemical solution of chalk. These rooted plants will live for a considerable time in the water, but do not appear to increase in any great degree; unless we except certain bulbous species, which develope leaves and flowers in tolerable perfection.

Plants, or rather rooted cuttings, so formed, do not appear to take up much of the colouring matter of simple infusions. In fact, as I stated in a paper of the 7th Vol. of the Gardener's Magazine, young balsams, when dissected, gave no evidence of the presence of the colour from a strong infusion of logwood, in which they had been kept for many days; but these rooted cuttings have the marvellous property of preserving water from putridity for a very long period. It is known that flowers kept in water, speedily cause it to become fetid, and full of animalculæ. Now, I have by me at this instant, a portion of the water in which I stuck a melon cutting, during the month of August. It remained clear, bright, and untainted, so long as the plant continued in it. I poured off a portion into a phial, about a month since, and it appears to be sweet and colourless to this day.

The energy exerted by the vital principle, is astonishing, and beyond the ken of mortal understanding. It appears to me that water is the pabulum of vegetable life, as perhaps, it was originally the source of all created matter; but that it undergoes some inexplicable change when in contact with the roots of plants, and blended with the soil. Probably it is decomposed by the nutritive matters in the soil, and becomes the simple sap of the plant, in consequence of this peculiar decomposition; during which process, as I have argued elsewhere, "electric agencies are developed, which constitute the ascending current that propels and carries forward the prepared aliment, and deposits it in the vessels appropriated to the purposes of assimilation and distribution."

A plant in a pot will live and thrive in pure sandy-loam, when no manuring substance whatever is added to the soil, provided it be supplied with a sufficiency of water. It has been found that little or no waste of the substance of the soil has taken place during a very long period, but experience also proves, that plants, with very few exceptions, grow better when the soil has certain portions of vegetable matters in it. Now these matters remain comparatively inactive and unchanged, however frequently the soil be watered, provided no plant be growing among them; but if the roots of a living vegetable be there, the matters become changed, more water is consumed, and the soil will require a renewal of the decomposable substances, or a change of the plant that it supports, in order to keep it in heart.

In concluding this article upon water, I conceive the conjecture may be fairly hazarded, that this energetic fluid is the prime, if not the entire source, of all the vegetable developements; I mean in as much as nutrition is concerned. A difficulty remains in respect to carbon, for the chemical destructive analysis of vegetable bodies, seems to

prove that, the bulk of their substance is resolvable into carbonaceous matter. The inquiry must be pursued when carbon becomes the subject of investigation. However, as water is incapable of dissolving charcoal, at least in any appreciable quantity; and as it is certain that not a particle of solid carbon, however impalpable it may be, can enter the absorbent processes of the roots: it can scarcely be supposed that the carbon of the plant is derived from introsusception by the roots. But the physiological chemist may say, that it is in the form of carbonic acid that carbon is introduced! Others of a more modern school, will refer the process of nutritive absorption to the formation of a substance said to be recently discovered, termed *humine!* Carbonic acid, doubtless may be detected in the juices of plants, but it is in all probability a result of electric vital action within the cells, and not one of simple absorption from the ground. The fact is, that carbon does not exist in the living plant; it is never detected but by destructive chemical action; or by fermentation after the extinction of the vital principle. Water therefore may be considered the pabulum of vegetable developement and growth without difficulty, and I deem it to be such, not perhaps in its crude native form, but modified by the agency of the substances within the soil, which become decomposed in the immediate vicinity of the roots. To produce the food of plants, all the great natural agents are of necessity employed, and water is the medium through which they act. It may indeed be itself decomposed, and by its elements produce new compounds with the decomposable substances it meets with; but whatever be its agency in the soil, the exciting cause appears to be the vital principle. which, stimulating the otherwise dead and effete matters in the soil, causes the plant to attract, or at least to receive from them, a simple, bland, colourless sap, that is modified and changed by other agencies within appropriate vascular organs, till at length it becomes assimilated into the substance of the organized being, which has excited and perfected these astonishing mutations. The reader, the more deeply he reflects, the more pertinaciously he investigates, will, in proportion, be inevitably convinced, that our knowledge is but perfect ignorance; and that however deeply read we may be in what concerns effects, of causes we are still in the dark; and that search how we may, they elude our utmost vigilance.

October 17th, 1833.

On Manures.

[FROM THE NORTHERN FARMER.]

MANURES to a farm are what blood is to the human body. The first object of a farmer should be to obtain, and preserve in the best manner all animal, vegetable, and compost manures, which can be made upon his farm, or procured elsewhere; but unless properly preserved, much of his labour is wasted and his lands are less productive. Fair experiments have clearly proved that the manure of cattle, preserved under cover or in vaults under barns, posseses a third more value, at least, than the same kind which has remained exposed to rains and the action of the atmosphere. This will not be doubted by any one who has any correct information upon the subject, or has by experiment ascertained the difference. We cannot well explain the reason of this great difference, without adopting the style and terms of

the chemist; but as our object is not to enlighten the learned, we therefore reject technical terms, and use language more familiar.

Vegetation is caused not so much by the quantity of manure mixed in the soil, as by its nutritious qualities. Should all farmers understand the fact, that none of the earthy or solid parts of manure enters into plants, or, in other words, that it is *only the liquid parts, or that portion of the manure which combines or unites with water, which produces vegetation*, or causes corn to grow, they would then perceive the necessity of preserving animal manure in vaults, under cover. The only value which the earthy part of the manure has, is to keep the soil into which it is ploughed, in a loose, a pulverized state, so as to render it capable of retaining, after rains, a greater quantity of moisture.

Some farmers have expressed an opinion, that the urine of cattle promotes vegetation as much as their manure. But whatever may be the difference in value, it is surely very important that the urine should be preserved in vaults mixed with the manure.

In the spring, when the manure is conveyed into the field, it should be ploughed in immediately and spread no faster than becomes necessary for ploughing; because at this season, the warmth of the sun produces rapid fermentation of the manure, and in a state of fermentation the most valuable or liquid part of the manure escapes in the form of gas, or, as it is often expressed, by evaporation.

Should a heap of manure at this season be covered with earth two feet deep, in a short period the whole mass of earth would be enriched by gas arising from the fermented manure. Hence the utility of covering fresh barn yard manure with straw, litter, weeds, street and door yard scraping, mud from swamps, and all kinds of decomposed vegetable matter. Skilful farmers will always make as large a quantity of compost manure as possible. It is a very certain way to enrich a farm and ensure abundant crops. If these truths are conceded, then it conclusively follows that the general practice of our farmers in respect to manure is injudicious. They let the manure lie in large yards, or the open field, exposed to heavy rains and the action of the atmosphere. A large portion of the nutritive qualities escapes in gas, or is washed away by heavy rains. The greater the exposure to the atmosphere the greater the loss. Therefore the practice of carting out the barnyard manure in the fall, and spreading it in small heaps upon the soil intended for ploughing in the spring, is still more censurable. But the fall manure is often carted into the fields and deposited in one or two large heaps to rot, for the purpose of manuring the corn and potato hills in the spring; and strange as it may seem, many old farmers yet believe that old rotted manure promotes vegetation better than fresh, or unfermented manure! They appear to be ignorant of the fact, the longer manure remains exposed to the rot, less nutriment, or food for plants it retains; and the more it becomes assimilated to mere earth.

To put either fresh or rotted manure in the hill in the season of planting potatoes and corn, as a general practice, is injudicious. But, half the quantity of fresh, unfermented manure, in the hill well mixed in the soil, would afford probably more nutriment than double the quantity of old rotted manure.

The moisture, necessary to vegetation, is conveyed to the roots of young trees, or the corn, or other plants, through the medium of earth. If any light or dry material is in contact with the roots, it tends to cut

off the regular and natural supply of water, and the plant must either extend its roots through the dry substance to draw its supply of moisture, or else become feeble, and perhaps perish. Hence, in a dry season, more particularly, manuring in the hill, often proves very injurious to the growth of plants. If manuring the corn-hill is ever judicious, it is only on a cold moist and sterile soil, or swarded land deeply ploughed, where a farmer has not a sufficient quantity of manure to mix in the soil. The surest method to enrich the soil for crops in future years, is to plough in the manure. The roots of corn, extending several feet around the hill, will find whatever nourishment the soil contains; and it is far better to afford a sufficient supply when the corn is coming to maturity, than merely to force the kernel to vegetate a few days earlier by means of a hot-bed.

Our preceding remarks show the importance of covering manure well with earth, previous to its fermentation. Hence, the the common practice of spreading the manure upon the surface and "harrowing it in," is attended with great loss, as a large portion will remain dry upon the surface, and for no other use than to enrich the atmosphere.

Manure being the life of a farm, every exertion should be used to procure all kinds of it. Compost, soot, ashes, lime, gypsum, burnt clay or soft bricks pulverized, decomposed vegetable substances, weeds, leaves of trees, coarse grass, &c. &c., will all tend to fertilize the soil. None are ignorant that such as is taken from the vaults, affords the greatest quantity of nutriment to plants. On farms it never ought to be lost. The yards for swine, ought always to be excavated, or be in the form of a basin, so that this manure in richness next to the last, should be preserved in a moist state. The same remark applies to the barn-yard for other cattle, except that the latter ought to have a level and dry margin for feeding cattle occasionally. Soon after planting in the spring, a farmer ought to commence hauling into these yards the different substances we have enumerated and any others within his reach, which can be converted into manure. These substances will become incorporated with the manure of the cattle, and also absorb their urine, and the whole mass will be less liable to dry up and waste in the summer season.

A good farmer will be careful to yard his cattle at night as much as practicable through the winter seasons, and in the day time through the warm. It has been found very beneficial to keep the cattle yardsin a moist state, by means of aqueducts whenever practicable. In fine, farmers should spare no labour or expense to obtain a plentiful supply of manure to fertilize the soil. Their liberality to "Mother earth" will be repaid with equal abundance.

In England nothing is lost, which can be converted into manures. And some English farmers fertilize their fields, in part, with the pulverized bones of animals; and for this purpose, have even gathered human bones from the plains of Waterloo.

W. CLAGGETT.

Portsmouth, January 16, 1831.

Pamunky [Virginia] mode of cultivating Corn,

The simplest, and best on flat land, and on a large scale, because the most labour saving.

[FROM THE FARMER'S REGISTER.]

I HAVE lately seen so many different ways of cultivating corn in our agricultural publications, the *Farmer's Register* among the rest, that I have thought it would be worth while to publish the Pamunky mode of cultivation, which I had before thought, was the one in general use in Virginia, for crops on flat land, and on a large scale—and which, in my opinion, for such land is decidedly the best.

The Pamunky mode is as follows, if I have been rightly taught. You break up your land in winter and spring, with large ploughs into five and a half, or six feet beds, (1) and plant as early as you can in April, by first running a tolerable deep furrow with a one or two horse plough right on top of the bed lengthways, and dropping your corn in this furrow, about three feet apart between the hills, (2) and covering either with the feet or hoes. The latter, however, is much the best way, as planting the corn with the hoes, gives the top of the bed, or ridge, a slight working, which is of very great service, if the weeds or grass have begun to grow, as they sometimes do after a mild winter on land that was ploughed early. Some persons run a light furrow across the beds every three feet distance, to show where to plant the corn; but the most usual way is for each hand to step off three feet in the row while planting, and the overseer carries a measure or stick three feet long, to regulate the step occasionally, and in that way the hands soon require accuracy.

After the corn is about six or eight inches high, the two horse ploughs start to "siding down" as it is called, which is to run the bar of the plough next to the corn, and throw down a good furrow from the corn, (and not throw the earth to the corn. as Col. Taylor (3) in his Arator, says, in his first ploughing of corn. I think there must be some mistake in the edition of Arator that I have, for corn will not bear the earth to be thrown to it, with a large two horse plough, while it is so young, and when the first ploughing ought to be given to it, *preceding* the hand hoeing, instead of *succeeding* it, as Col. Taylor directs in Arator, which saves a vast deal of labour—however more of that hereafter.) As soon as the plough has got a little start in siding down, the hoe hands follow and "ridge out" as it is called; that is to

(1) Some persons break up their land flush, and then cultivate it in the way I am about to describe; but for flat land, bedding is preferable, as it keeps the land drier in the winter, and enables you to plant earlier in the spring.

(2) Some persons plant nearer or further, according to the strength of the land, but three feet from hill to hill is the most usual distance, and then leave from two to three stalks in a hill, according to the strength of the land.

(3) Col. John Taylor certainly ought to be considered the most useful man to the Virginia agriculturist we have ever had, and is well entitled to our gratitude; for he was the first man in Virginia, who ever turned our attention to the subject of improvement, by his success in agriculture, as well as his writings on the subject. A part of his system, however, did not suit hilly broken lands, (and no doubt was never intended by him, to be applied to them, though it has been very injudiciously so applied,) however well adapted to flat lands the north and south bedding may have proved.

say, with the hoes they weed, and scrape away the earth, weeds, and grass, from the corn, which was left on a narrow ridge by the siding down of the ploughs. The object of this ridging out, is to expose the young corn as much as possible to the sun, (which is not very powerful at this season of the year,) to strengthen it and drive away insects, such as ants, cut worms, wire worms, and all insects that the sun has the power of driving away. Besides, the corn now being on a narrow ridge, facilitates the hoe work very much, as there is very little left for the hoe to do, if the ploughing has been well done. Also if there is wire grass, or blue grass, it is the easiest, and in fact the only way that I know of, to enable the hoes to get the grass away from the corn; and unless you do get it away, you will make no corn to a certainty: for if you cover up blue grass or wire grass by throwing the furrow, that Col. Taylor speaks of, to the corn, so far from their being killed thereby, they will grow faster than the corn, and choke it while so young.

Together with this ridging out with the hoes, the hands at the same time thin out, and replant, or set the corn, if the land is sufficiently moist. This ridging out, is generally considered the most important part of the whole cultivation. It gives the corn such a start as nothing else will, by admitting the sun to the roots of the young corn, and driving off insects of all kinds. I have frequently made experiments of admitting the sun to the roots of the corn when very young, in this way, and worked some hills in other ways, for instance, by weeding the grass well off from the corn while young, and then putting the earth back to it—and I have invariably found the corn that was exposed to the sun by siding down and ridging out, would take an earlier start, and grow off more kindly, and the other never to overtake it. I have even, on good loamy rich land, scraped the earth away so much from the corn at this early stage of it, as to cause it to fall down, merely as an experiment, and even in that state, it would rise and get the start of corn that had the earth thrown up to it. But it will not do on poor, or very stiff land, to make the corn so bare as to fall down: the above was merely an experiment to see how far it could be carried with impunity. Corn is very like cotton in this respect, and requires the same sort of cultivation while young.

As soon as you have gone over all your field, siding down with the ploughs, and ridging out with the hoes, &c. you then, with the same two-horse ploughs, (the corn being now large enough to bear the earth, being generally about two or three feet high, and out of the way of cut worms and other insects,) throw a good large furrow back to the corn on each side, and nearly or quite lap up the earth on the foot of the stalks, which saves a great deal of hoe work. Your hoes follow the ploughs again, and weed over the corn, and put a flat hill to it, and in that way check the grass and weeds.

After getting over the field in this way, the next and last operation, is to throw another furrow with the two horse ploughs (4) from the centre of the "balk," as it is called, to the corn on each side, and this must be a large and deep furrow, so as to reach as near the corn as possible, though it cannot quite reach it. The hoes again follow the ploughs and weed over the corn and put a large flat hill to it, and kill the weeds and grass as well as possible, and this is what is called "laying by" the

(4) Some persons use the one horse plough in each ploughing of the corn, and then they have to run more furrows at each ploughing, but the two-horse plough is much preferable.

corn. (5.) The corn is then generally ready to begin to tassel and shoot, or is tasselling and shooting. Sometimes it is necessary to run a skimmer up and down the rows of corn, if it should be grassy after the last ploughing and weeding, merely to scrape out some of the grass, but this latter operation is not absolutely necessary for the crop of corn, though it makes the sowing of wheat easier and better in the fall. But it is very dangerous to tamper with corn after it has begun to shoot and tassel, unless you can have rain whenever you call for it. I believe there has been more corn lost by working too late, than by grass.

You will remark, that by this mode of making corn, each operation suits the age and size of the corn. In the first process, (the siding down, &c.) you run the ploughs very close to the corn when it is young and the roots have not extended far, so that you do not cut many of them: or if you do, you do no injury to the corn while it is so young. In the second operation, (the throwing back the earth to the corn, &c.) you run the ploughs further off, when the corn has attained some size, and when it might be injured by cutting the roots, if there should be very dry weather afterwards. In the third operation, (the "laying by," &c.) you run the ploughs still further off, when the corn will be more apt to be injured by cutting the roots, if you should have a drought afterwards.

Although three times going over the corn with the hoes, appears very often for a mode of making corn which pretends to be the simplest and most labour-saving, the fact is, where you have not wire grass, or blue grass to contend with, the hoe work in this mode of making corn is very quickly done, and the three hoeings are not more than equal to once and a half the times of hoeing over corn in other modes of cultivation. For you will remark, that in the first weeding, or ridging out, you have only a very narrow slip, or ridge, not more than six or eight inches wide to weed, which can be done very fast. In the second weeding, the plough has nearly done all the work, for the earth is nearly lapped across the foot of the corn, so that it leaves not much for the hoes to do; aud in the third, and last weeding, although the plough has left rather more to weed, yet it is not more than a common hoeing; but this is the "laying by," and the most tedious of the three, as is to be expected.

When the land has either blue grass, or wire grass, you must use the double shovel, (6) or scarifier of some kind (the double shovel is the

(5) It should be observed, that although the corn has been ploughed over three different times, and very efficiently too, yet the land in fact is only gone over entirely, once, which is the greatest possible saving of plough labour, and a vast saving of manure on the land manured for corn; for the less frequently you turn up your manure, in the cultivation of the corn to the hot summer's suns, the less is lost by evaporation.

I have said nothing about manuring, &c. for corn here, because I set out with the view simply of giving the mode of cultivating the crop as practised in the great corn country of Virginia, the Pamunky, where I think the mere cultivation of it is very well understood.

As I said before, this mode of cultivating corn does not answer on very foul lands, such as wire grass, or blue grass, or any other very stubborn grass land, without the addition of some scarifier, such as the double shovel, after each ploughing and hoeing; but with this additional cultivation, it is the best possible mode, even on the foulest land. The Pamunky corn lands are generally clean lands.

(6) The double shovel when well constructed, is one of the best scarifiers, and in fact, one of the very best farming implements in the the world. It is the only

best) frequently after every ploughing and hoeing, and you must have a dry summer in addition to all this too, to kill it; for wire grass, and blue grass must never be covered up with the earth (if you wish to kill them) and the double shovel, or scarifier, prevents that by dragging the grass up to the surface, so that the sun may kill it.

There may be better ways of making corn than this, with more labour; and by more tillage, you also may have a cleaner field to sow wheat upon in the fall: but, for the same amount of labour, I repeat that in my opinion, this mode of cultivating corn is the best.

H. C.

plough, or utensil of any kind, with which I could ever check the blue grass or wire grass. It goes tolerably deep, and does not choke up much, and it keeps the grass near the surface, so that the sun may kill it. It also keeps the surface smooth and level, and thereby prevents hilly land from washing. It is somewhat like the harrow in this respect; and the greatest advantage of this plough is, that it goes over somuch ground in the day, and enables you to repeat it so frequently. I cultivated about thirty acres of blue grass land in corn this summer, 1833, in the Pamunky mode, and after every ploughing and hoeing, as before mentioned, I ran the double shovel about four or five times in each row of corn; and it completely eradicated the blue grass, and left the land clean for wheat.

On the Cultivation of Vines, (Cucurbitaciæ.)

[FROM GOODSELL'S GENESEE FARMER.]

MANY people find much difficulty in raising vines, owing to the depredation of the black flea or the striped bug. As soon as vegetation becomes visible, thousands of these insects will gather on the tender plants, and often cut them down as soon as they appear above the surface of the hills.

By following the subsequent rules you may easily cultivate melons, cucumbers, &c. without much difficulty, Soon after warm weather has commenced, select a rich, warm, dry place in your garden or field; plough or spade it deep, at the same time incorporating the soil with well decayed manure; sheep manure is the best.

Lay out your ground in hills four and a half feet asunder, each way, raising them considerably above the natural surface of the ground, with the hills inclined towards the south. Having prepared your hills you are ready to commence planting. Distribute no less than ten or fifteen seeds in a hill, covering them one quarter of an inch in depth. As soon as the plants have made their appearance, take of ashes or soot two parts, plaster one part, pulverized charcoal one part, mix these ingredients together, until the mixture is well incorporated. With this composition enter your garden or field, in the morning while the dew is on, and with a quantity in your hand throw it over the plants. dusting them as much as possible, in order to suffocate the insects, taking particular care to dust the under part of the leaves.

By following these directions you will have the pleasure of seeing your plants in a thriving condition, and in a few days entirely out of the way of these troublesome insects.

As soon as the plants begin to interfere with one another, commence thinning them out. Pull out all but two or three in a hill, leaving those that look the most promising. There are many persons, who leave no less than half a dozen in a hill—this is a *mistaken notion*; for I am confident that could you rest assured that no worms would molest the roots, it would be better to pull all out but one; and I am fully persuaded too, that you would gather more fruit from the vines

L. of C.

where there was but one or two plants in a hill, than you would, were you to leave half a dozen.

Where you to leave too many, the vines will become so thick that when they set for bearing, most of the fruit will decay before it comes to any maturity. MILES BEACH.

New-London, March 20, 1834.

On Foreign and Native Grapes.

[FROM THE FARMER'S REGISTER.]

Magnolia, near Richmond, December 11, 1834.

I REGRET that when writing you my short note of the 20th of September last, the hurry of the moment prevented me from expressing myself more at large, respecting *Norton's Virginia Seedling*, and the Cunningham's grape, of the county of Prince Edward. After the experimental culture of the grape for nearly twenty years, (for I commenced it when a boy at school,) I consider that I have at last arrived at the point so much desired,) that is, the discovery of a grape, or grapes, *which afford abundant annual crops; and the culture of which we may lend our labour and care, with the certainty of proper return, for all expenditures.* All grapes, introduced into notice, either foreign or indigenous, except the two varieties above named, are subject to rot, mildew, and other casualties, in such a manner, that you can never rely upon any other return than an occasional small yield for the table. At great expense I have collected most of the varieties in a continuous line from Rome to the upper Rhine, and these have all been discarded as worthless; having left me with an empty purse, as a requital, for many years hard labour. The house (in which I now live) stands upon the site, once occupied by the *Pied Rouge, Malvoisie, Muscat de Frontignan Mammolo, Cariniolo, Nigrillo, Verdillo, &c. &c.* sent to me from Havre, Leghorn, and the Island of Madeira. Foreign vines seem defective in strength of leaf: the scalding suns, and innumerable tribes of insects of this State, and other regions of our country, destroy the foliage, so that during the months of July and August, the fruit perishes from inability to feed on the proper constituents for completing their maturity. Examine, yourself, all of our native vines, and remark the dense, and almost indestructive fibre of the leaves, and you can readily conceive, that nature has so fashioned them with a view to withstand the casualties above mentioned. Look at the foreign vines, with their delicate foliage, and think how illy they are formed to resist the agency of burning suns, and voracious insects. The vine from the banks of the Douro, that variety from which the Port wine is fabricated, I am told throws out a large, tough leaf, and will, perhaps, from this circumstance, suit our climate better than those hitherto introduced from abroad.

The Cataba grape, with proper care, produces a wine of fine quality, having the lusciousness of the Malmsey Madeira, combined with a smack of the French Muscat. Wine of this fruit, one year old, has been sold by me this winter, for three dollars per gallon. I regret to say that in some localities it is subject to rot—never, however, to such extent but that you have a tolerable return for your expense in the cultivation.

The Isabella is worthless, in every respect, save one, (the making

of tarts) used as you would the young apricots and gooseberries.—Whoever attempts the fabrication of wine from this meagre berry, will meet with disappointment. For the most part, it does not equal the common twenty cent cask claret of commerce. It is also subject to acquire acidity, bitterness, or a musty taste.

Norton's Virginia Seedling, has never been known to rot or mildew: neither is the wood at all injured by the most severe winter, in any exposure. The bloom for the last ten years, that is, ever since its first bearing, has resisted the ravages of spring frosts. The berries are so closely congregated on some bunches, as to indent one another; yet they all prove equally ripe at the same period of time. So replete are they with the saccharine principle, that if a bunch at full maturity be closely compressed in the hand, it will continue to adhere even after the fingers are expanded; and if a bunch is accidentally suffered to remain on the vine after the first frosts of autumn, the berries become raisins, a circumstance I have never known to take place with any other grape, indigenous or exotic. I have a small cask of wine made from the Seedling last year. It is luscious beyond any thing you can conceive. Some say it resembles Burgandy Madeira—others the Lachrima Christi of Mount Vesuvius. A young gentleman not long since from that country, (Italy) says that abroad he should have drank it for the last named wine.

The Cunningham's Prince Edward grape alike resists the winter and spring frosts, and never fails to produce a crop of excellent fruit both for the table, and the press. As yet I have not a sufficieut number of vines, to test in a satisfactory manner, the quality of the fruit. What has been made upon a small scale, resembles the wines imported into this place from the house of Murdock and Company; unquestionably the best wine we get from Madeira.

The Worthington grape vine is a great grower, but not abundant as a bearer; the intensely high lake colour residing in the skin of this fruit, may be used to advantage in tenting wines. If it ever bears in quantities sufficient for making wine, you may expect it to yield a rtch port.

The Scuppernong, or White Bullaee, of Roanoke, ripen its fruits with me in October. It posseses a honied sweetness, and musky flavour. I think in a few years it will be more cultivated in Virginia—for the richness of the grape will eventually recommend it to the vigneron for the purpose of enriching the weak must of other fruits.

The editor of the American Farmer received fruit, purporting to be Norton's Virginia Seedling, from Pennsylvania, and made the report upon it which was afterwards published in your Register. This gentleman's opinions were so at variance with what I had published to the world, that both myself and friends were at considerable pains to underceive him, and to convince him that he had taken the wrong pig by the ear. Yet the decree has been recorded, and like the laws of the Medes and Persians, cannot be reversed. If I really supposed the circumstance could at all retard the introduction of these two vines into culture, (the Seedling and Cunningham,) I would be at more pains to combat his opinion. Relying, however, upon the truth of my assertions, and the strongest testimony to support them, I do not hesitate again to say, that these two grapes properly cultivated, will, at no distant period, be a nucleus whence will emanate an advantage to our exports, scarcely to be calculated.

DANIEL NORBORNE NORTON.

Introduction of the Potato, its culture and advantags of new Seed.

[FROM THE GENESEE FARMER.]

THAT the potato *(Solanum tuberosum)* is a native of South-America, and was first introduced into Europe from that country, by the way of Spain, has been placed beyond a reasonable doubt by the researches of Sir Joseph Banks, and the discoveries of late travellers. The first mention made of the root, is found in a scarce volume printed in 1553, where it is called *papas*. The potato was introduced into Ireland by Sir Walter Raleigh in 1586, and soon found their way into England. They were not much known in London until 1650, and at first were cultivated in botanic gardens only. As an article of food the potato was at first lightly esteemed, and the best methods of producing it little understood, as will appear from the following remark in Evelyn's work: "Plant potatoes on your worst ground, take them up in November for winter spending; there will enough remain for stock though ever so exactly gathered." It is curious to observe the opposition which its introduction has in almost every instance at first called forth; but, like most other things which possess intrinsic value, it has gradually worked its way into notice and favour, and is cultivated within the tropics and 64° North, while it seems adapted to most exposures, and every variety of soil. In some parts of Germany the potato did not gain a foothold until 1720; in Switzerland in 1730, and it was not until the extreme scarcities consequent upon the wars of the French Revolution were felt, that the prejudices against the potato could be subdued in France, and its culture successfully attempted. The extensive culture and use of the potato in Europe as an article of food, has unquestionably added millions to its present population, as it has prevented those distressing famines which used so frequently to occur; and the poor of England and Ireland may forgive Sir Walter for the introduction of tobacco into those countries, when they remember that to him they also owe the potato, a root which constitutes their chief support. It appears to be now pretty generally acknowledged, that the maximum of the duration of life in vegetables, as well as animals, is determined by a law of nature, under whatever circumstances the individual may be placed; and Mr. Shirreff, in the *London Horticultural Transcript*, maintains that in England, not a healthy plant of any kind of potato that yields balls or seeds, and which was in culture twenty years ago, can now be found; and every agriculturist of experience in this country, which is probably as favourable to the production of the potato as any region of the globe, if they are not prepared to go as far as the English writer, must admit, that the most esteemed varieties of any given time are very apt to degenerate and become worthless in the space of a few years. Nature obviates this natural process of deterioration, by reproducing the individual from the seed; and in England, this plain course of producing new varieties or renewing old ones, has been adopted with great success. There, many persons are employed in raising what are called seeding potato. This operation is performed as follows: The largest as well as earliest potato balls or berries are gathered when thoroughly ripened, from several of the choicest varieties; these are kept in dry sand until spring, or else when gathered, the seeds are immediately separated from the pulp and dried, and then kept in paper until wanted. As soon as the

season will admit, the seed is sown in a light, clean soil, in drills half an inch deep, a foot apart, and in the drills at the distance of six inches. When the plants come up they are properly thinned, kept clean of weeds, and earthed up as may be necessary, generally not more than twice. When the top turns brown and decays, the tubers or roots are taken up and carefully preserved through the winter from frosts. The tubers will be of various sizes according to circumstances, generally of the size of a walnut, or perhaps larger. These planted in the spring will produce roots of sufficient size to determine the kinds and qualities of the produce, which may be ascertained by cooking in different ways, and thus their relative value for the table, &c. fixed. The third year the tubers will have attained their ordinary full size and excellence, which they will maintain for a number of years, when they again require a renewal. Hitherto there has been no difficulty among us of procuring new varieties from abroad, or renewing our old kinds of the potato; but it might be well for our gardeners, and even our farmers, occasionally to adopt the English mode of preserving this valuable plant in perfection, or even furnishing specimens superior to any now cultivated, since it is well known that the most valuable of our varieties are not like the original stock, but are the result of careful cultivation. W. G.

Hog Pens.

[FROM THE NEW-ENGLAND FARMER.]

It is a trite, though no less true remark, that "*experience is the best teacher of wisdom.*" In no respect is this more true than in the planning and construction of dwelling houses, barns, &c. There is scarcely any one, who, after the most deliberate reflection and consultation, has erected a house, barn, or any other building, who cannot, upon use, see something that might have been made better or more convenient—and something that he would alter or amend if he could. Man's judgment is not *perfect*, nor never can be. We can scarcely go into the smallest dwelling-house,—even "the lowly cottage,"—or visit the smallest farming premises, where we cannot see some *convenience* not common to others; and some domestic arrangement, which might be copied by others with advantage. It is thus, by combining the greatest number of the conveniences of others, about our premises, that "the greatest happiness of the greatest number" will be promoted.

In no respect is there need of more improvement in the arrangement and construction of the out-buildings of the farmers in this vicinity, than in that of hog-pens. I have often regretted to see very lady and gentleman-like appearing hogs, with their numerous offspring around them, whose sweet and melodious voices,—particularly just before dinner,—indicated a remarkable propensity (as a phrenologist would say) to *sing*, compelled to inhabit premises, in which every thing but comfort and convenience seemed to be united. Without even a *bed of straw*, with a *dirty* place to take their food, and without any place in which they could exercise the business of "furrow-turners," an employment so congenial to their health and so agreeable to their feelings. I could not but feel sorry that so respectable and useful a race of animals, as the *whole-hog* family are generally considered, were not provided with quarters more convenient, pleasant and profitable.

Many years since, when I was a mere tyro in the business of farming (and I now feel great want of skill in that occupation,) an old gen-

tleman remarked to me, that "hogs ought to *work* enough to pay for their keeping." Hogs work! thought I, the man must be *crazy*,—or does he mean to have them labour on the tread-mill! But time and experience have learned me, that by providing hogs with a plenty of muck, turf, &c. they will at least, pay *much* towards their keeping, by the manure of the best quality, which they will *manufacture*, and that too, without the aid of any kind of *machinery* or any *water power*, *steam power*, or *any other power*, but *hog power*.

Having had occasion, recently, to construct a hog pen, in which I believe there is at least *one* improvement, I will describe it for the benefit of my brother farmers, and the good of all pork eaters and pork makers in general—hoping and believing that for these my philanthropic efforts in the *swinish* cause, I shall, at least, receive a vote of thanks (an *honour* conferred on many others before me) from the innumerable *hog multitude*, with which our country abounds.

The aforesaid *hog pen* is 21 feet long by 18 feet wide, with posts 8 feet long, which gives room for a chamber above, from which, by a board left loose for the purpose in the floor, the hogs can be fed with corn, and in the summer with potatoes, &c. that may be put away there, without much labour. Ten feet across one side is occupied with three pens—and each pen has a yard in the rear (an indispensable I consider it) in which the *raw material* is manufactured into first rate manure. But what I consider the improvement is in first placing down the sleepers, then the floor, and then the *sills on the top of the floor*. Each pen is boarded inside as well as out; and here is the advantage, notwithstanding the continual wet of a hog pen, the sills being above the floor, they are kept dry and free from decay.

The great difficulty with hog pens is that the sills rot so quick. By my plan a new floot can be laid, and I cannot see why my hog pens will not last as long as any other building.

The remaining part of it, not occupied by the pens, into which an external door opens, is occupied by a cauldron for cooking potatoes, &c., for my hog family, and by swill barrels, provender casks, and the usual et ceteras of a hog pen. The floor of the part not occupied by the hogs, is 9 inches above the other part, which makes it *dry*, and affords a handy place to feed them. One corner of each of the three hog apartments is devoted exclusively for their lodging,—which is constantly supplied with dry straw, to the no small comfort of my *porkers*, young and old.

If the above description shall conduce, in a small degree, to the better and more convenient construction of the hog pens of my brother farmers,—or to the comfort, and consequently to the growth and fattening of that very necessary appendage to a farm,—*short-nosed*, *short-eared*, *short-legged* and *broad-backed swine*, then my purpose will be fully answered.

FARMER C.

Bernardston, (Mass.) Dec. 2, 1834.

On Breeding Horses.

[FROM THE ENGLISH FARMER'S MAGAZINE.]

THE following is extracted from a communication to the Editor, by T. A. Knight, Esq. at Downston, Herefordshire.—"Having introduced for the use of my tenants a high priced stallion, of the breed of the large London dray horse, I wish to state to agriculturists the grounds

upon which I wish to anticipate much advantage from the introduction of so large an animal. He will, I have reason to believe, be, when full grown, not less than seventeen hands high, and very compact in form.

"I conceive myself to have proved, by many experiments, of a part of which an account was published some years ago in the Philosophical Transactions, that the length of the legs of the offspring of all those animals which nature has intended to accompany their parents in flight, at an early age, is governed wholly by the habits of the female parent. This tribe of animals comprehends the horse, the cow, the sheep, and deer, and many others. If the female parent be of low stature, and descended from a breed of a similar form and size, the length of the legs of the offspring will be short, and will not be increased in length, though they will in strength, by any influence of its male parent, however tall and large that may have been; and the converse of this proposition will be found equally true.

"The experience of almost every farmer must have taught him that horses with drop shoulders and bodies, and capacious chests, are more capable of bearing hard and long-continued labour than those of which the shoulders, and of course the chests, are shallow and the legs long; but comparatively few know how rapidly the powers of draft in any animal mechanically decrease with the length of the legs, comparatively with the depth of the shoulders and body. If a horse, proportioned as English horses now generally are, be sixteen hands high, his fore legs, measured from the elbow joint, will be about three feet, or nine hands high, and his shoulder about two feet four inches, or seven hands high. If such a horse be able to raise, by means of a cord passed over a pulley, a weight of a thousand pounds, another horse similar to that in every other respect, except that of having its legs eight inches shorter, would, on account of the mechanical advantages of its form be able to raise twelve hundred and fifty pounds, or one-fourth more, with considerable less exertion; for his power would increase with the diminished length of his legs, nearly in the same proportion as the power of the weights upon the longer arms of the steelyards is increased by being made to recede from the points of suspension; and if the length of the leg of such horse, comparatively with the depth of the shoulder, were further diminished, its power would increase in an accumulating ratio. The enormous strength of a bull of mature age, affords familiar evidence of the truth of these positions; and I doubt much whether the offspring of a Norwegian pony, and a strong and low draft mare would not be found capable of drawing a heavier weight up hill, to any considerable distance, than the largest horse of the ordinary form and proportion; whilst it would not, probably, exceed two-thirds of its weight, nor require more than two-thirds the quantity of food; and it would possess much more activity, and be much less subject to accidents. And I have good reason to believe that more perfect animals, for supplying mankind with food, may generally be obtained by cross-breeding from females of small, and male animals of large size, than from any breed of fixed and permanent habits, relative to size."

Feeding Live Stock in Winter.

[FROM THE NORTHERN FARMER.]

THERE is, perhaps, nothing relating to rural economy, in which farmers differ more, both in theory and practice, than in feeding their cattle in the winter season. We speak not now of the different kinds of fodder, or of their comparative value in the feeding of stock, but merely of the manner and frequency, with which the cattle are fed.

Many farmers believe it indispensable, both as to the good condition of their stock and the greatest economy of fodder, to feed them five times, at least, each day, during the winter; while others practise feeding but three or four times in a day; and again, others but twice.

Experiment alone can prove which of these modes of feeding will carry stock through the winter in the highest order, and with the least expense of fodder. Our own experience on the subject is decidedly in favour of feeding but twice in a day. More than twenty years' observation and experience in the keeping of stock, in a climate, where, on an average, dry fodder is required to be given more than seven months in the year, has given us an opportunity to test the value of the several modes of feeding above mentioned. We were first induced to try the experiment of feeding twice in a day only, from information communicated to us by a very intelligent and successful farmer, in a neighbouring town. He said he had a few years before occasion to call on a farmer's widow to aid in the appraisal of several cows, and found them near the end of the winter in such high order, as to draw his particular attention.

He inquired of the widow, particularly, the manner in which they had beenk ept, and found she had given them nothing but hay through the winter; and that in consequence of having no man or boy to tend her stock, she had been obliged to do it herself; and being in rather feeble health, she had never fed them but twice in a day. This led him to examine, particularly, as to the kind and quality of the hay with which the cows had been fed. He found the hay not so good as his own, while the cows were in much higher order than his, though his had been fed five times a day through the winter.

From a knowledge of these facts, he afterwards adopted the same mode of feeding, giving his cattle just so much, twice a day, as they would eat up perfectly clean, and no more; and has since found it, by experience, both a saving of fodder and a benefit to his stock. From this information we adopted the practice of feeding but twice in a day, something more than ten years ago, and have found the same favourable results.

On the Feeding and Management of Milch Cows.

[FROM GOODSELL'S GENESEE FARMER.]

IT is of great consequence in the management of a dairy that the cows should be treated with gentleness, so that they may not be afraid of being milked, nor dislike the milker. A cow will not yield her milk willingly to a person she fears, hates, or apprehends ill treatment from. Young cows, in particular, may have their characters for gentleness, and good milkers formed by the manner in which they are treated. This truth, of much importance to all concerned in a dairy or its products, is well established and illustrated by communication

from Mr. Russel Woodward, published in *Memoirs of the New-York Board of Agriculture*, in substance as follows:

Having formerly kept a large number of cows, I observed many amongst them dried up their milk so early in the fall, that they were not profitable, while others with the same keeping, gave milk in plenty, until late in the season. I likewise have often heard my neighbours observe, that some of their cows, though very good in the forepart of the season, dried up their milk so early that they were unprofitable, and they would have to put them off; I accordingly found it expedient to find out the cause if possible: and when I brought to mind the ways that some of my young cows had been kept and milked, I attributed the cause to the milking of them the first season they gave milk; and by many experiments since, I have found that young cows, the first year they gave milk, may be made, with careful milking and good keeping, to give milk almost any length of time required, say from the first of May to the first of February following, and will give milk late always after, with careful milking. But if they are left to dry up their milk early in the fall, they will be sure to dry up their milk each succeeding year, if they have a calf near the same season of the year; and nothing but extraordinary keeping will prevent it, and that but a short time. I have had them dry up their milk in August, and could not by any means make them give milk much past that time in any succeeding year. I had two heifers, which had calves in April, and after getting them gentle, I set a boy to milk them for the season, (which is often done the first season on account of their having small teats:) he was careless, and dried them both up in August. Although I was satisfied I should lose the greater part of the profit of them afterwards, yet I took it upon me the following year to milk them myself and give them good feed, but to no purpose. I could not make them give milk much past the time they dried the year before. I have two cows now that were milked the first year they had calves, until near the time of their calving again, and have continued to give milk as late as ever since, if we will milk them.

Unfermented Swill.

[FROM THE MAINE FARMER.]

A QUESTION was asked in one of our late numbers why unfermented swill was not so good for hogs as that which was undergoing fermentation. It is generally considered that swill which is already undergoing fermentation will fatten swine much faster, and, is of course, more economical than swill not in that condition. As no one has appeared as yet for the purpose of answering the question of our correspondent above alluded to, we will venture a few remarks. Vegetable substances contain a large quantity of carbon, and this same substance also enters largely into animal materials, especially into fat and oils, constituting a large portion of these substances. It follows, therefore, that in animals by the process called digestion, a portion of this carbon of the food is separated, and assimilated or converted into chyle and blood, and from these into fat, muscle or flesh, and such like materials which make up the animal body. But before the digestive powers can do this, the food must undergo a change, and the carbon contained in it combined with something that will render it easily dissolved in the fluids of the body. Solid carbon is not dissolved in fluids. Charcoal which is one form of carbon, and indeed is nearly pure carbon, we all know is not soluble in fluids; but still it may be

easily dissolved by adding another substance to it. Take a piece of charcoal and burn it in a close vessel, and you change its form. It combines or unites with the oxygen or vital air, and is converted from a hard solid visible state into an invisible air or gas called carbonic acid or fixed air, and strange as it may seem, this same substance which a few minutes ago was a lump of charcoal, is now an invisible gas, and the next minute by agitating it with water is absorbed and becomes liquid, and the next minute, if drank, will be converted into a portion of a walking, living, breathing animal.

To go back to our first remark, that vegetable substances, such as are used for food, contain a large portion of carbon, not in a pure state to be sure, but mingled with many other substances which render it more liable to undergo fermentation. Now what is fermentation? It is nothing more nor less than this carbon combining with the oxygen of the air or atmosphere being converted into an air, and escaping in the form of bubbles of gas as it works its way up through the mass. The swill, therefore, that is in this state, is ready to be dissolved in the fluids of the stomach and converted to the animal body. If it is not fermented it will not digest so soon, and of course is not changed to fat so soon, and consequently the hog does not fatten so fast. In order to bring on fermentation, three things are necessary, viz: moisture, air and heat; and heat is also engendered by the fermentation whichserves to keep it up so long as there is any carbon to be converted to gas. And the effects of this fermentation and heat when carried on in the animal stomach, is curiously illustrated by the animal itself.

A close observer, informed us the other day that in his experiments in feeding hogs, when he gave his hog swill that was unfermented, he would go and lie down on the ground, but when he gave him swill that was fermenting, he would lie quietly in his pen on a plank. This difference of conduct is, we think, is accounted for, by the fact that heat is caused by the act of fermentation, and when fermentation is carried on in the stomach, Sir Porker finds it necessary to sleep out of doors.

Singular Modes of Fattening Cattle.

[FROM GOODSELL'S GENESEE FARMER.]

In some parts of France, according to an English writer on Agriculture, they fatten with maize, (Indian Corn,) "but in order to render it tender, they pour boiling hot water upon it, cover it up close, and give it to the cattle the same day, and in this way it is a most excellent fattener, both of cattle and poultry. But in order to make them fatten sooner and better, they give them every night, and sometimes of a morning, a ball of pork grease as large as an apple; they say this is both physic and food, and makes them thrive the better.

"The fact of hog's grease being given, was confirmed at Souilliac; it is given to increase the appetite, and answers so well, that the beasts perfectly devour their food after it, and their coats become smooth and shining. The most fattening food they know for a bullock, is walnut oil cake. All here give salt plentifully, both to cattle and sheep, being but 1d. per pound. But this practice is, more or less, universal through the whole kingdom.

"In Flanders, from Valenciennes to Orchies, for fattening beasts, and for cows, they dissolve linseed cake in hot water, and the animal drinks, not eats it, having various other food given at the same time, as hay, bran, &c.; for there is no point they adhere to more than always to give a variety of food to a fattening beast."

PART III.

MISCELLANEOUS INTELLIGENCE.

New Publication.—We have received the first number of the *American Gardener's Magazine and Register of all Useful Discoveries and Improvements in Horticulture and Rural Affairs;* conducted by C. M. Hovey and P. B. Hovey, jun. published in Boston by Hovey & Co. Upon a cursory view of this publication, we were much pleased at the valuable and interesting matter it contains, and the arrangement of its subject. This work appears to be modelled after English publications of the same character, and embraces some of the most valuable articles on the various subjects connected with Agriculture. We are much gratified at seeing the appearance of such a work in our country; we cannot have too many of them, and the more they spring up in various sections of the Union the better; the great diversity of our climate, is productive of various articles in one region of our country which could not be cultivated in the other. These works by detailing the various systems of Agriculture, peculiar to the different sections of our Union, present a mass of knowledge that becomes of immense value to the country at large, and are calculated to increase the happiness of the human race. We, therefore, sincerely hope, that this work will prosper, and that it may diffuse that light and knowledge upon the subjects it proposes to treat, which it is so well calculated to promote.

Test of the Quality of Milk.—The quality of milk is a subject of vast importance to dairy-men, and yet they seem not generally to be attentive to it. Every one may easily try it, if not with *perfect* exactness, yet very satisfactorily by the following means. Take several Cologne bottles, or any other very deep vials, and fill them with the milk of different cows, and let it stand long enough for the cream all to rise. The thickness of the cream, which will be apparent, will indicate the the quality of the milk from which it rises. This operation should be repeated a sufficient number of times to establish the relative richness of each cow's milk, which taken in connexion with the quantity she gives in the year, will establish her character as a milker.—*Gen. Far.*

[*Tumblers or wine glasses answer as well: the milk used for this purpose should be taken after the cow has been milked nearly dry, as there is a great difference between that first drawn and the last.*—Ed. So. Agri.]

Dairy Secret.—Have ready two pans in boiling water, and on the milk's coming to the dairy, take the hot pans out of the water, put the milk into one of them, and cover it with the other. This will occasion great augmentation in the thickness and quality of the cream.—*N. E. Far.*

Scientific Principles of Transplanting.—The removing of growing plants from one part of the garden to another, is done for various reasons, and the science of transplanting will consequently depend on the intention of the gardener in the operation. The principal facts to be recollected are, that every plant takes its food by the tips of the root fibres, and that the sap thence carried up into the leaves has much of its water and oxygen carried off by exposure to light, particularly to sunshine. It follows that if part or all of the tips of the root fibres be broken off or bruised, the plant will be kept hungry or starved, just as an animal would be with its mouth much injured or blocked up, while if a plant in such a state is placed in the sunshine, the water and oxygen carried off thereby, will very soon cause it to flag, wither and die.—*Rennie.*

Weevil.—The great destruction of wheat produced by this annoying insect, it is said, may be prevented by very simple means. In stacking wheat, if four or five quarts of salt be sprinkled on every hundred sheaves, it will be secured from destruction from weevil, and besides make the straw more valuable as fodder. Or if, after the wheat is thrashed, a pint of salt is mixed in every barrel, or if the grain be put in old salt barrels, the weevil will not attack it.

Means of Rendering the Vine more Productive.—A foreign journal, of some ability, recommends four ounces of alum to be mixed with four pellets of clay, by means of a sufficient quantity of water, and the roots of the vine being uncovered on a fine day towards the end of the winter, they are to be moistened with this mixture, and the earth then changed, so that what was previously uppermost shall be undermost. It is asserted that through this operation a vine produces a great additional quantity of grapes.

Kreosot, or Flesh Preserver.—A great discovery in chemistry has lately been made by Dr. Richenback, of Germany; he having succeeded in extracting from tar and smoke a hitherto unknown substance, which he calls Kreosot, (flesh preserver.)

This substance possesses the property of resisting putrefaction, in a most eminent degree; and when diluted with water, fresh slaughtered meat, after having been immersed in it for a few minutes, may be kept in the open air, and in the hottest weather, for any length of time, without becoming in the least affected.

This fact led several eminent physicians to experiment with it, in the treatment of human diseases, applying it both internally and externally, in which they have been crowned with the most striking success.

People afflicted with the horrid disease of cancer, after having been despaired of by the most skilful physicians, have been completely cured by Kreosot.

For wounds and sores in general it has been found the best remedy known: and is particularly recommended in surgical operations, as it prevents inflammation, and stops the most excessive bleeding almost instantly.—*Phil. U. S. Gaz.*

Brick Machine.—Some months ago we extracted from the Mount Vernon Gazette, a brief description of a machine for pressing brick, invented and put in operation by several gentlemen of that village. We have recently received from Mr. Harkness, one of the inventors, a pamphlet, giving a full and accurate description of the machine, and accompanied by a coloured diagram, designed to enable any skillful mechanic to construct a machine without further instruction.

The bricks are made of clay in nearly a dry state, and are pressed with great force, so as to cause the particles to adhere, the surface being left smooth as if planed; they are said to possess a beautiful appearance, and to possess, when well made, greater strength and durability than the common kind. In making the brick, a great amount of labour is saved.

P. S. Several bricklayers and other gentlemen recommend the brick made by this machine, as being superior to any heretofore made in this country, as regards *strength, durability, and beauty.—Zanesville, (Ohio) Gaz.*

For Housekeepers.—A short way to make old bread new, or better than new.—Bread that is several days old, may be renewed so as to have all the freshness and lightness of new bread, by simply putting it into a common steamer over a fire, and steaming it half or three quarters of an hour. The vessel under the steamer containing the water, should not be more than half full, otherwise the water may boil up into the steamer and wet the bread. After the bread is thus steamed, it should be taken out of the steamer, and wrapped loosely in a cloth to dry and cool, and remain so two or three hours, when it will be ready to be cut and used. It will then be like cold new bread. By this process we may work such a change in *old* bread, as it will make it in all respects *new* except in its deleterious qualities—and thus at the same time gratify the taste, and subserve the purposes of health and economy. New bread, it is well known, cannot be eaten with perfect impunity, until it has undergone the process of *ripening*—and indeed physicians say it ought not as a general rule, to be eaten till the day after it is made. A way is pointed out above, by which a taste for new bread may be gratified, without exposure to injury.

We have received the above suggestions from an experienced housekeeper who has often tried the experiment, and, to our knowledge, with complete success—and we publish it for the benefit of others.—*Springfield Gaz.*

Rice Griddle Cake.—Boil one large cup of whole rice quite soft in milk, and while hot stir in a little flour, rice flour or Indian meal; when cold add two or three eggs with a little salt. Bake in small thin cakes on the griddle.—*N. E. Far.*

Horses and Oxen.—The following comparison between the expense of a yoke of Oxen and a Horse at a marketable age, is given in the report of the Trustees of the Kennebec (Maine) Agricultural Society, which we find in the Maine Farmer:

Raising a Horse.		*A Yoke of Oxen.*	
Use of Stud,	$4,00	Use of Bull,	$2,00
Use of Mare,	20,00	Raising Calves,	10,00
Keeping first winter,	7,00	1st Wintering,	12,00
Insurance,	1,00	Insurance,	50
At one year old,	$32,00	At one year old	$24,50
2nd year—Summering,	3,00	2nd year—Interest,	1,49
Wintering,	7,00	Summering,	4,00
Interest,	1,92	Wintering,	12,00
Insurance,	1,00	Tax,	33
Tax,	50	Insurance,	50
At two years old	$45,42	At two years old	$42,82
3rd year—Summering,	5,00	3rd year—Summering,	7,00
Wintering,	11,00	Wintering,	12,00
Interest,	2,71	Interest,	2,56
Tax,	75	Insurance,	75
Insurance,	1,50		
At three years old	$66,38	At three years old	$65,13
4th year—Summering,	5,00	Price of Oxen,	80,00
Wintering,	15,00	Price of Horses,	60,00
Interest,	3,98		
Tax,	1,00	Difference,	20,00
Insurance,	1,50	Loss on the Horse,	34,36
Shoeing once,	1,50	Gained in the Oxen,	14,87
At four years old	$94,36	Difference to raiser,	$49,23
Labour equal to breaking.			

Splitting Rocks.—In the granite quarries near Seringapatam, the most enormous blocks are separated from the solid rock by the following neat and simple process. The workmen having found a portion of the rock sufficiently extensive, and situated near the edge of the part already quarried, lays bare the upper surface, and marks on it a line in the direction of the intended separation, along which a groove is cut with a chissel, about a couple of inches in depth. Above this groove a line of fire is kindled, and this is maintained till the rock below is thoroughly heated, immediately on which a line of men and women; each provided with a pot of cold water, suddenly sweep off the ashes, and pour the water in the heated groove, when the rock at once splits with a clean fracture, square blocks, of six feet in the side and upwards of 80 feet in length, are sometimes detached by this method. Hardly less simple and efficacious is the process used in some parts of France, where millstones are made. When a mass sufficiently large is found, it is cut into a round form, several feet high, and the question then arises, how to divide this into pieces of a proper size for millstones. For this purpose grooves are chisseled out, at distances corresponding to the thickness intended to be given to the millstones, into which grooves wedges of dried wood are driven. These wedges are then wetted, or exposed to the dew, and next morning the block of stone is found separated into pieces of a proper size for millstones, merely by the expansion of the wood, consequent on absorption of moisture; an irresistible natural power thus finishing, almost without any trouble, and at no expense, an operation which, from the peculiar hardness of the texture of the stone, would otherwise be impracticable but by the most powerful machinery, or the most persevering labour.

Corn Sheller.—The Free Press states that Mr. A. L. Norcross of Hallowell, has invented a machine to shell corn, which is superior to any thing else of the kind, in its simplicity, cheapness and thorough operation. Its cost is but $3, consisting of but one wheel three feet in diameter, and a cylinder one foot in diameter, with a feeder attached to one side of it. A boy twelve years old can work the machine with perfect ease, and thoroughly strip the ears of corn as fast as they can be dropt in one by one.—*The Age.*

Silex in Straw.—In the ashes of rye straw 70 parts of silex in the 100 have been found.

A Mode of Destroying Ants.—A writer by the name of Roughly, some of whose sketches of West India agriculture are republished by Loudon, says, "Poisoning by arsenic is the most expedient mode of getting rid of ants, as the living will feed on the dead, so that the whole nest, (by devouring one another) are thus killed.

Leaves for Potatoes.—Leaves piled up in a pen, with alternate thin strata of swamp mud, when partially decomposed are found a superior preparation for the Irish potato. Put around the root of fruit trees, this compost has been found to produce a healthy and vigorous growth. Its operation has been much increased in its efficacy, by the addition of lime to the mass. The finest Irish potatoes that I have seen produced in a southern climate were produced by the addition of this compost.—*N. Y. Far.*

MONTHLY CALENDAR

OF

HORTICULTURE AND FLORICULTURE

FOR FEBRUARY.

With a view of rendering our work useful to those who attend to that branch of the subject of Agriculture connected with Horticulture, we shall accompany each number with a detail of such vegetables proper to be cultivated for the month in which the number is issued, with some directions for their management.

We shall, at the same time, direct the attention of our readers to the care necessary in the management of their fruit trees, and last not least, our readers shall receive ample directions in the management and care of the Flower Garden, the various seeds necessary to be sown, and the several interesting flowers that bloom in each month, and such other information as may be calculated to render that healthy and interesting vocation peculiarly gratifying to the lovers of Flora. A highly valued friend to whose labours we are largely indebted, will extend his aid to us on this subject. We should be gratified to receive from other sources hints upon this branch, as much may be gained by the comparative views of those who are in the same pursuit, and the result of their experience will be particularly valuable to all who delight in the pleasures of gardening.

VEGETABLE GARDEN.

The early part of this month is favourable for sowing the several varieties of Peas. They are to be sown in open situations in drills, about four feet apart, and the seeds covered about three inches deep. Sow Early York, Sugar-Loaf and the larger kinds of Cabbage seed. If you have plants from seeds sown in October and November, let them now be set out in good ground two feet apart. Sow Cauliflower seed; they will produce the largest Cauliflowers, and will head earlier than those sown in the following October; although in many situations they do not survive the moisture and heat of the summer. Sow Lettuce, Spinach, Carrot, Turnip, Beet, Parsnip, Radish, Onion and Leek seeds about the middle of this month. Plant out Irish Potatoes, and set out roots of Asparagus.

FRUIT GARDEN.

Plant Apple, Pear, Peach, Nectarine, Apricot and Fig Trees, especially the latter, as this is the only month in which the roots and cuttings of the Fig will succeed. Prune Vines and Orange trees—prune and dress your Strawberry and Raspberry beds.

FLOWER DEPARTMENT.

Set out cuttings of Roses and all kinds of evergreens; plant cuttings of Geraniums, and nearly all the plants cultivated in the green-house; divide the roots of Pinks and Sweet Williams; plant also cuttings and pipings of the above. Sow all perennial and biennial seed—Stocks, Astors, and Polyanthus. Plant the root of Dahlias.